Twenty-four Mile Creek
Stream and Riparian Assessment

Project Setting

The Twentyfourmile Creek Watershed encompasses an area of 17,062 acres, or 26.7 square miles, in Caribou County, Idaho. The watershed is located in the most northeastern portion of the Portneuf River Subbasin (USGS Hydrologic Unit Code 17040208). The watershed is bounded on the north by the Caribou/Bingham County line. On the west, the area is bounded by the Fort Hall Indian Reservation. On the south, the boundary is the Portneuf River and the Eighteenmile Creek watershed. The southern boundary continues east by northeast through the Portneuf Valley. The eastern boundary is the divide along the Chesterfield Range. Figure 1 shows the map of the watershed.

The watershed consists of two subwatersheds. There is an upper subwatershed (USGS Hydrologic Unit Code 170402081301) and a lower subwatershed (USGS Hydrologic Unit Code 170402081302). The divide between the upper and lower subwatersheds occurs at the confluence of Pole Canyon and Twentyfourmile creeks. The upper subwatershed drains 8,953 acres and the lower subwatershed drains 8,109 acres. Twentyfourmile Reservoir is located halfway between the headwaters and the confluence with the Portneuf River. The reservoir is in the upper subwatershed and about 1.4 miles upstream of the Pole Canyon and Twentyfourmile creeks confluence. The historic townsite of Chesterfield is located within the lower subwatershed. Elevations range from 7,246 feet at Twentyfourmile Peak in the Chesterfield Range to 5,314 feet at the confluence with the Portneuf River. Approximately 85% of the land within the watershed is privately owned. About 15% is publicly owned and managed by the USDI-Bureau of Land Management and the Idaho Department of Lands. Rangeland is the predominant land use within the watershed at 73% of the acres. Table 1 and Table 2 shows the land ownership and land use, respectively. Figure 2 displays the ownership within the watershed while current land use is shown in Figure 3.

Table 1. Twentyfourmile Creek Watershed Land Ownership

Land Ownership	Acres	Percent of Total
BLM	1,524	8.9%
Private	14,491	85.0%
State	1,013	5.9%
Water	34	0.2%
Total	**17,062**	**100.0%**

Table 2. Twentyfourmile Creek Watershed Land Use

Land Use	Acres	Percent of Total
Irrigated Cropland	3,330	19.5%
Non-Irrigated Cropland	1,163	6.8%
Rangeland	12,396	72.7%
Riparian/Wetland	72	0.4%
Urban	101	0.6%
Total	**17,062**	**100.0%**

Figure 1. Twentyfourmile Creek Area Map

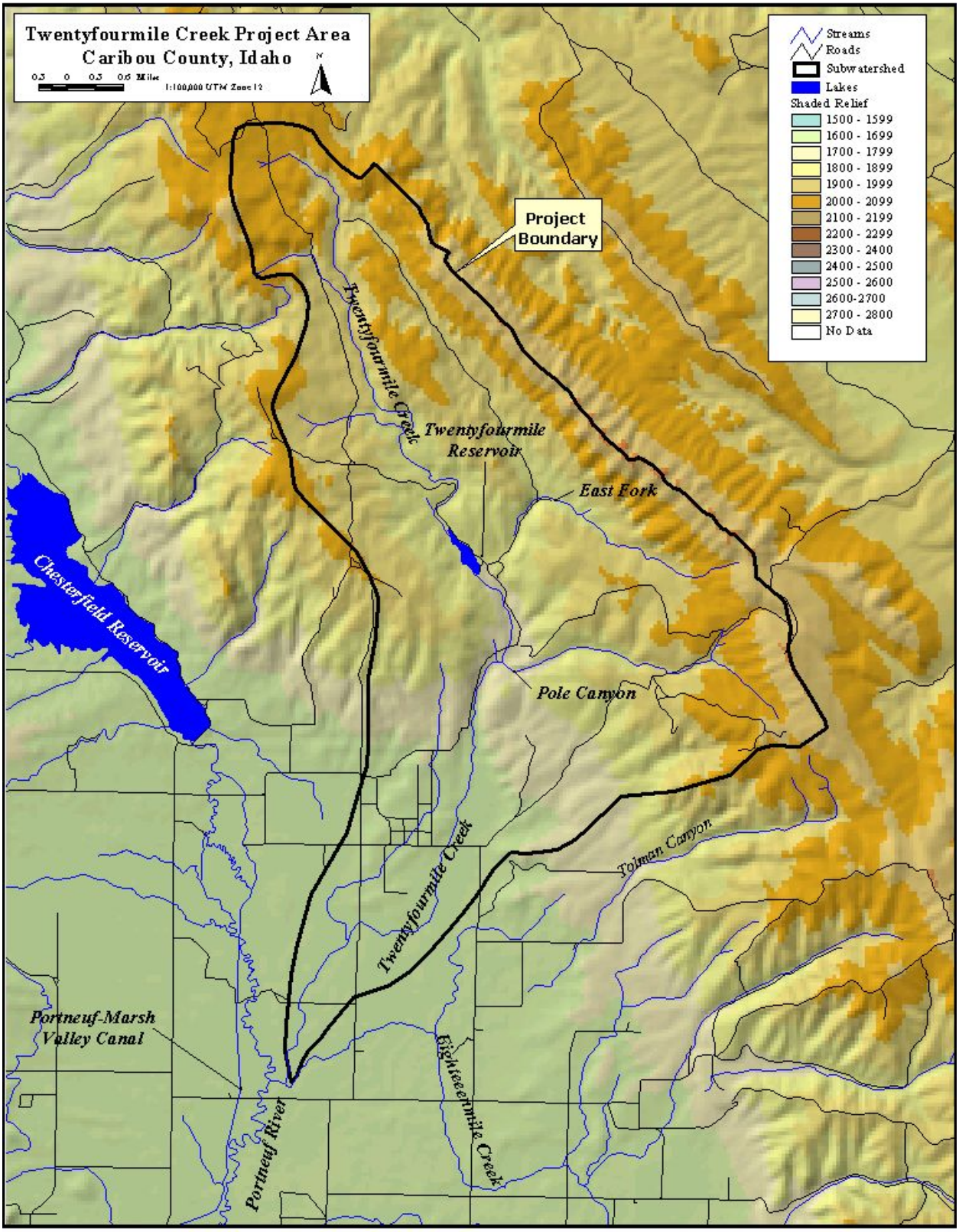


Figure 2. Twentyfourmile Creek Land Ownership Map

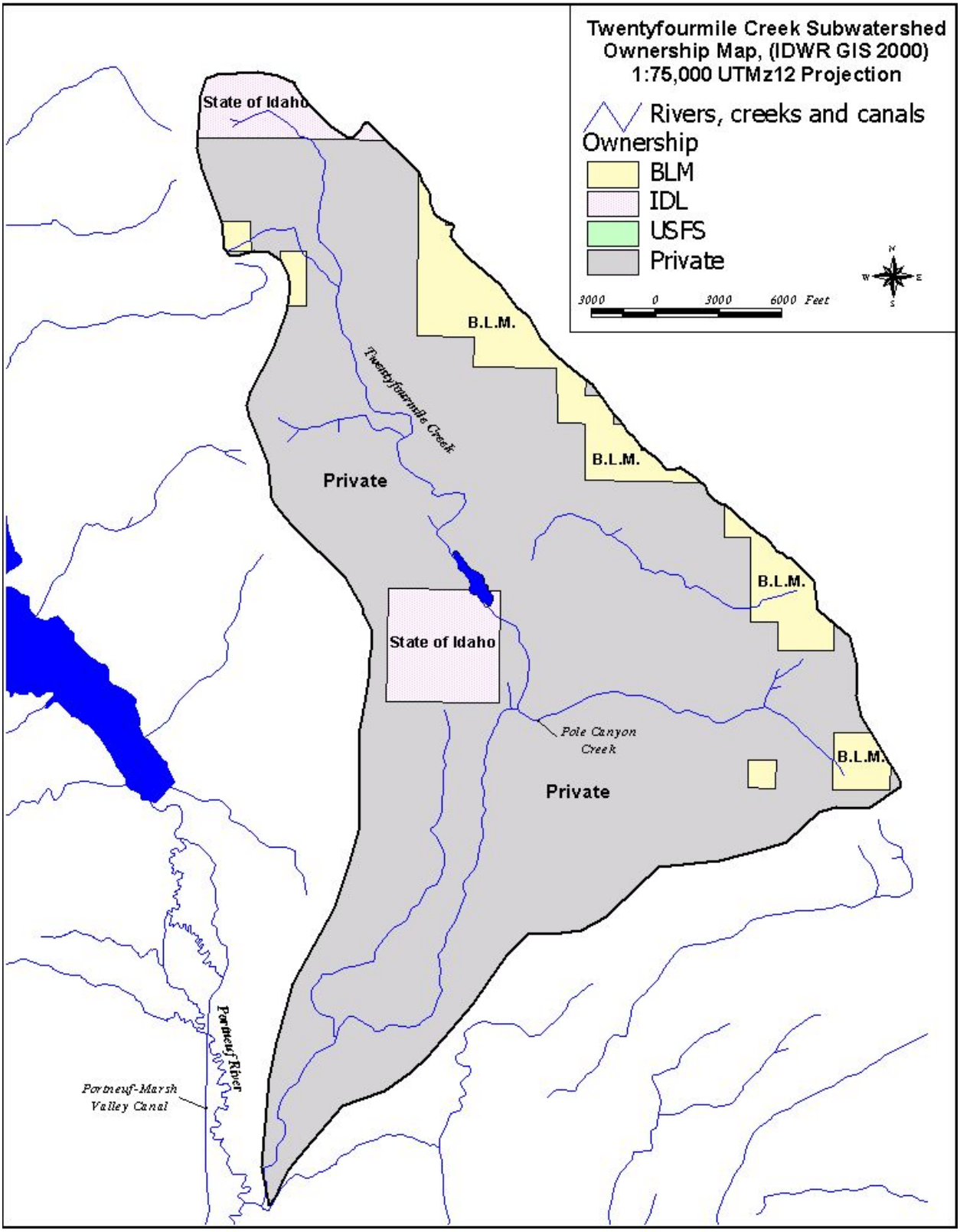
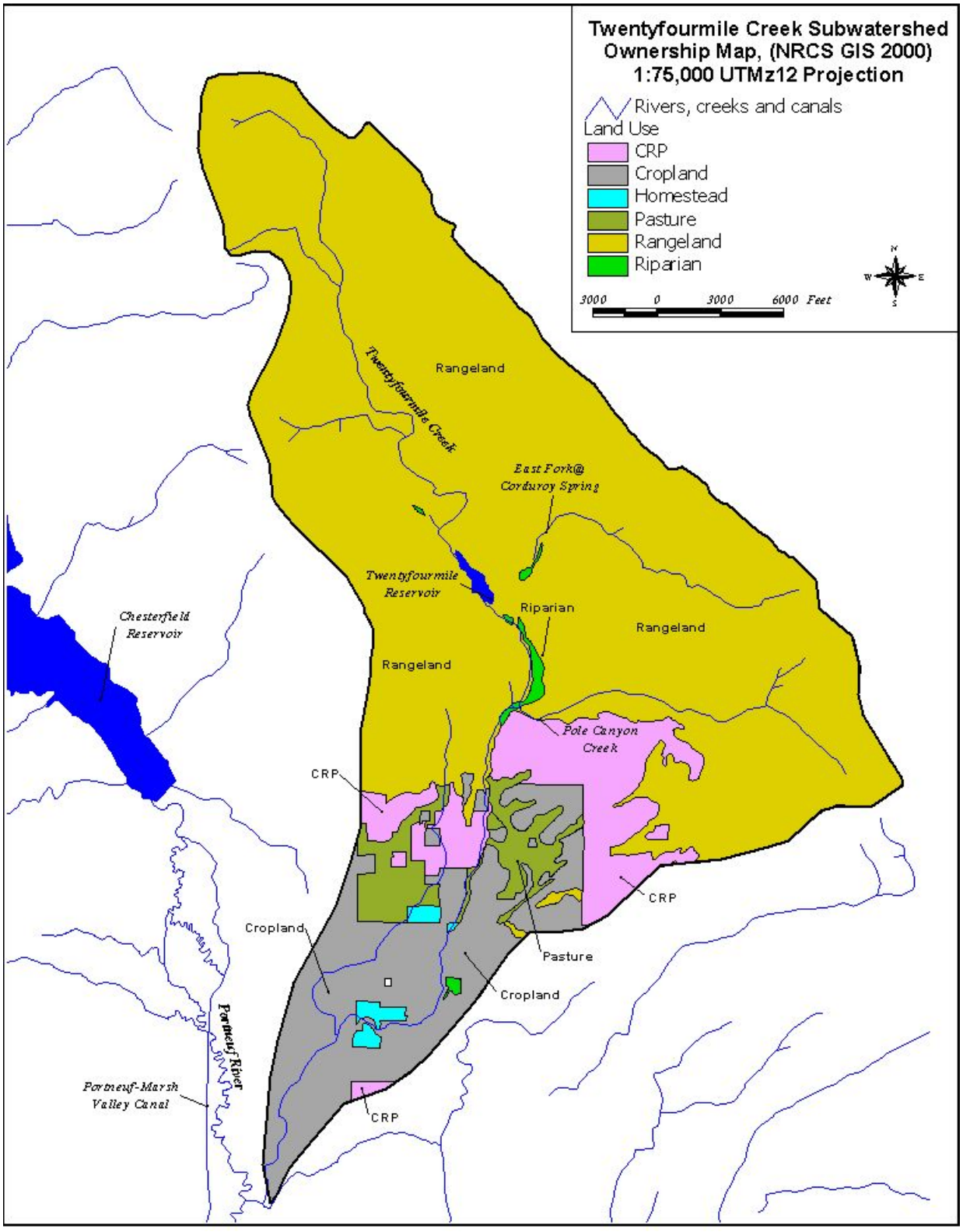


Figure 3. Twentyfourmile Creek Land Use Map



Background

Twentyfourmile Creek (stream segment WQLS#2342) is on the State of Idaho's 1998 303(d) list of water quality impaired waterbodies. Twentyfourmile Creek is listed from its headwaters to the Portneuf River, which is approximately 14 miles in length. Beneficial uses that are designated on Twentyfourmile Creek include cold water biota, secondary contact recreation, and agricultural water supply. These beneficial uses need verification (IDEQ 2000).

Twentyfourmile Creek watershed was inventoried and planned in 1992 by the Caribou SCD, ISCC and USDA-NRCS as part of the Upper Portneuf River Channel State Agricultural Water Quality Program (SAWQP). An implementation alternative was selected that did not include Twentyfourmile Creek in the critical project area. The Upper Portneuf River Channel SAWQP Project was implemented and ended in 2000. That project enabled 23 project applicants to implement BMPs on 9,104 critical acres and treated about 8 miles of the Portneuf-Marsh Valley Canal and Portneuf River.

In the spring of 1985, spring runoff and reservoir releases led to Twentyfourmile Creek downcutting 15 to 20 feet into the valley floor and extended downstream for approximately two miles. The downcut channel begins at the confluence of Pole Canyon and Twentyfourmile creeks (northwest quarter of Section 22, Township 6 South, Range 39 East). The sediment was moved downstream in approximately one day. It was estimated that the majority of this material moved as bedload through the stream channel (NRCS 1992).

Presently this downcut channel seems to be in a similar condition as it appeared in August 1992. The head cut that deflected off of the upper terrace and proceeded up Pole Canyon Creek is still present. Because of this incision, previous floodplains are now abandoned and no longer sustain riparian vegetation at the higher elevation. However in these incised channels, the riparian vegetation is quite vigorous along the stream perhaps due to the reduced access by livestock, favorable soil or streambank substrate at the lower elevation. Currently the riparian vegetation consists of alders, dogwoods, and willows that are very dense and provide greater than 75% canopy cover over the stream in these reaches.

Climate

Twentyfourmile Creek is in the intermountain region typified by brief, warm dry summers, cool rainy spring and fall seasons, and long, cold winters. Snowpack normally begins to accumulate in late October and remains in the higher elevations until early May (CSCD 1992).

The average growing season is 114 days on the valley floor, and less in the higher elevations. The last frost in the spring can occur as late as June 19th in 5 out of 10 years and the first frost can be as early as September 12th in 5 out of 10 years. Extremes of temperature typically range from the minus twenties in winter to the mid-nineties in summer. Average annual precipitation on the valley floor is 15 inches, with mountain areas receiving up to 30 inches. Most of the annual precipitation occurs in the early spring and late fall, and snowpack accumulation is the most important source of water for the region. The spring snowmelt is the most critical water erosion period, especially if there is rapid melting, combined with frozen, impermeable soils.

Geology

Twentyfourmile Creek is located in the most northeastern portion of the Portneuf River Subbasin. Topography in the watershed is mountainous with steep mountains and narrow valleys. There are five geologic formations present within the watershed and are listed below in Table 3. A geologic map of the watershed is shown in Figure 4.

Table 3. Twentyfourmile Creek Watershed Geology

Formation	Description	Acres
Sedimentary (Ms)	Mississippian shallow-water coralline limestone interval of southern Idaho	3,119
Sedimentary (P)	Permian phosphatic sandstone, mudstone and chert of eastern Idaho	455
Sedimentary (PPNc)	Lower Permian to Middle Pennsylvanian limestone and sandstone	741
Sedimentary (Qa)	Quaternary alluvium; may contain some glacial deposits and colluvium in uplands	4,507
Sedimentary (Qg)	Quaternary colluvium; fanglomerate and talus plus some glacial debris in upland valleys	288
Sedimentary (Tpd)	Tertiary continental sediments; Pliocene stream and lake deposits; may be due to volcanic and block-faulting events	7,885
Sedimentary (TRl)	Triassic shallow-marine to non-marine sediments of eastern Idaho; Lower Triassic limestone and chert above shaley sandstone, siltstone and limestone	67
	Total	**17,062**

General Soils

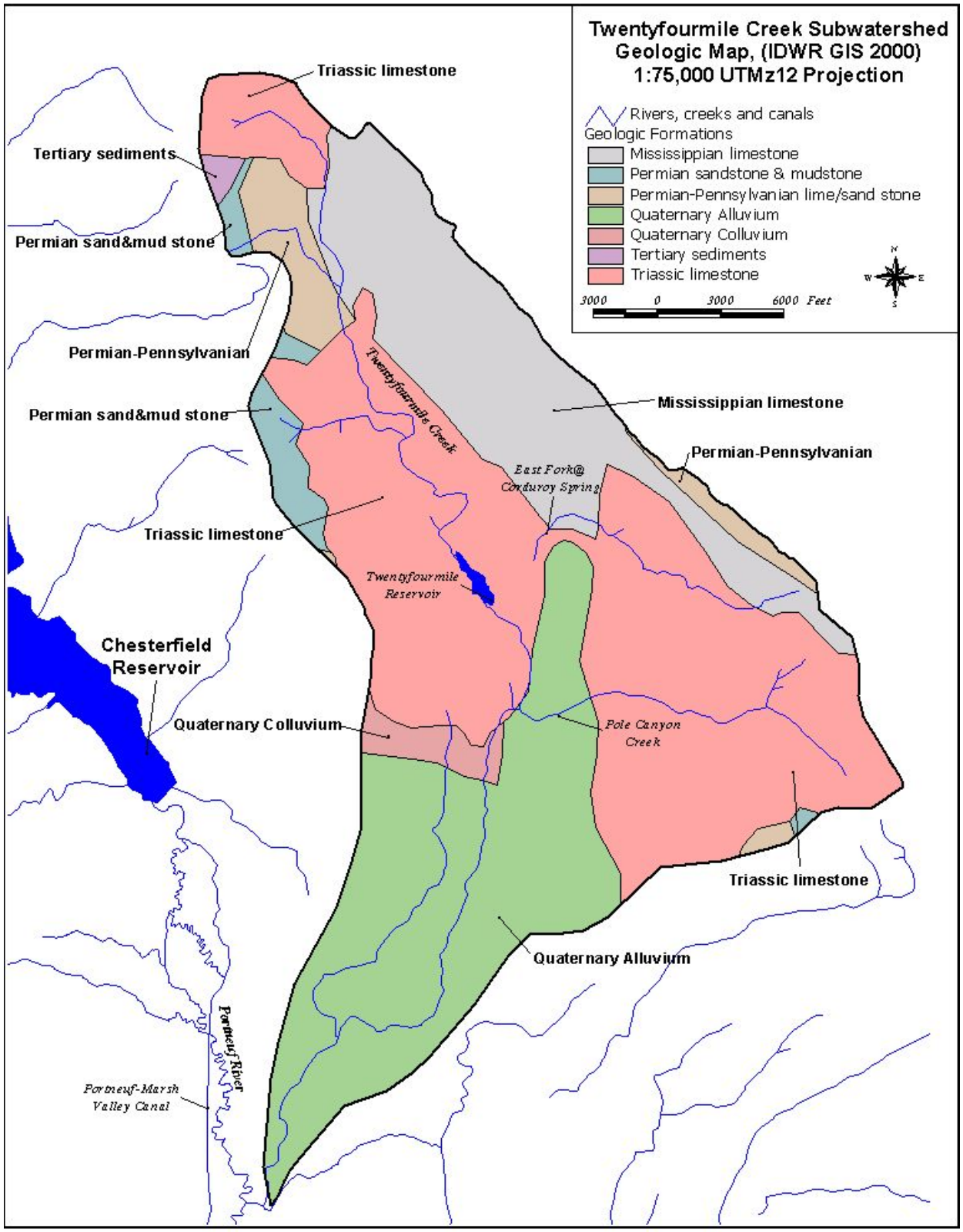
The project area covers parts of two soil survey areas, which include the Fort Hall, and the Bear Lake-Caribou soil survey areas. Soils mapping in the Bear Lake-Caribou survey area are currently in progress and have not been published. The soils within the project area vary dramatically. The general soil description does not provide enough detail for site specific planning, and is suited only for general planning purposes. For more detailed soil information, consult the Natural Resources Conservation Service office in Soda Springs.

The hills and mountains on both sides of the Portneuf Valley have shallow to very deep soils with moderately steep to very steep slopes. The natural vegetation on these soils provides excellent protection from erosion, but when overgrazed or disturbed many of these soils are highly susceptible to water erosion.

Soils in the valleys, where most of the cropland is located, are well drained and generally deep or very deep except around occasional outcrops of basalt. Most of these soils formed from loess or silty alluvium derived from loess and are highly susceptible to water erosion when left bare. Along the Portneuf River and other drainages there are moderately well to very poorly drained soils that have a seasonally high water table and are occasionally flooded.

The lower third of Twentyfourmile Creek flows through the Bear Lake-Chesbrook-Picabo map unit complex. All three of these silty soils have a severe water erosion hazard if the water velocity is high and the streambanks are bare. In addition to this, cutbanks in the soil along the creek are very susceptible to caving in and adding more sediment to the stream channel.

Figure 4. Twentyfourmile Creek Geologic Map



Hydrology

Twentyfourmile Creek drains an area of 26.7 square miles in size. The watershed has a southeast to south aspect. The watershed is 11 miles long and 5 miles wide. Twentyfourmile Creek is 14 miles in length from its headwaters to its confluence with the Portneuf River. There are approximately 14 miles of tributaries to Twentyfourmile Creek. Twentyfourmile Creek is a 3rd order stream.

Twentyfourmile Creek originates at 6,637 feet elevation and flows 5.9 miles descending to 5,904 feet elevation where it empties into Twentyfourmile Reservoir. About 3 miles of tributaries enter the creek above the reservoir. There are no irrigation diversions above the reservoir. The reservoir is 0.6 miles long and covers 34 surface acres with 700 acre-feet of water at maximum storage elevation. The dam is regulated by the Idaho Department of Water Resources and is categorized as a moderate risk, intermediate size dam at a height of 23.4 feet.

Below the reservoir, the creek leaves the dam at an elevation about 5,876 feet and runs 7.5 miles descending to an elevation of 5,314 feet at the confluence of the Portneuf River. About 11 miles of tributaries come into Twentyfourmile Creek below the reservoir. The largest of the tributaries are East Fork at Corduroy Spring and Pole Canyon Creek.

The longitudinal profile for Twentyfourmile Creek is shown in Figure 5. The Idaho Association of Soil Conservation Districts (IASCD) is monitoring water quality parameters at two sites on Twentyfourmile Creek. The upper site is 1/4 mile above the reservoir and the lower site is on Twentyfourmile Creek just east of Hansen Rd. Figure 6 shows the discharge measurements at the Hansen Rd site since the monitoring project began. Discharge data gaps are due to the creek being frozen.

The irrigation season of use within the watershed is from May 1st to October 31st. Below the reservoir there are three irrigation diversions. The first occurs just above the Chesterfield Road. The second occurs about ¼ mile downstream of Chesterfield Road. The third occurs approximately ½ mile downstream of the Chesterfield Road. The last diversion diverts the majority of the remaining flow into two lateral ditches.

The creek also flows through numerous wetlands at the confluence with Eighteenmile Creek. Additionally, near the confluence with the Portneuf River, the creek is partially diverted into flood-irrigated hay meadows. The Portneuf River flows intermittently in this section because the Downey Canal carries nearly all the water that formerly was carried by the Portneuf River's natural channel. The canal is owned by the Marsh Valley-Portneuf Canal Company and extends south from the Chesterfield Reservoir outlet for 7.8 miles to its confluence with the river channel just northeast of the bridge on Kelly-Toponce Road. Twentyfourmile Creek enters the river channel approximately 3.9 miles upstream of where the Downey Canal confluences with the river channel. The Downey Canal was constructed, in conjunction with the Chesterfield Reservoir Dam, in 1908-1912 to provide a dependable source of irrigation water for farms in the Marsh Valley area of Bannock County.

Figure 5. Twentyfourmile Creek Longitudinal Profile

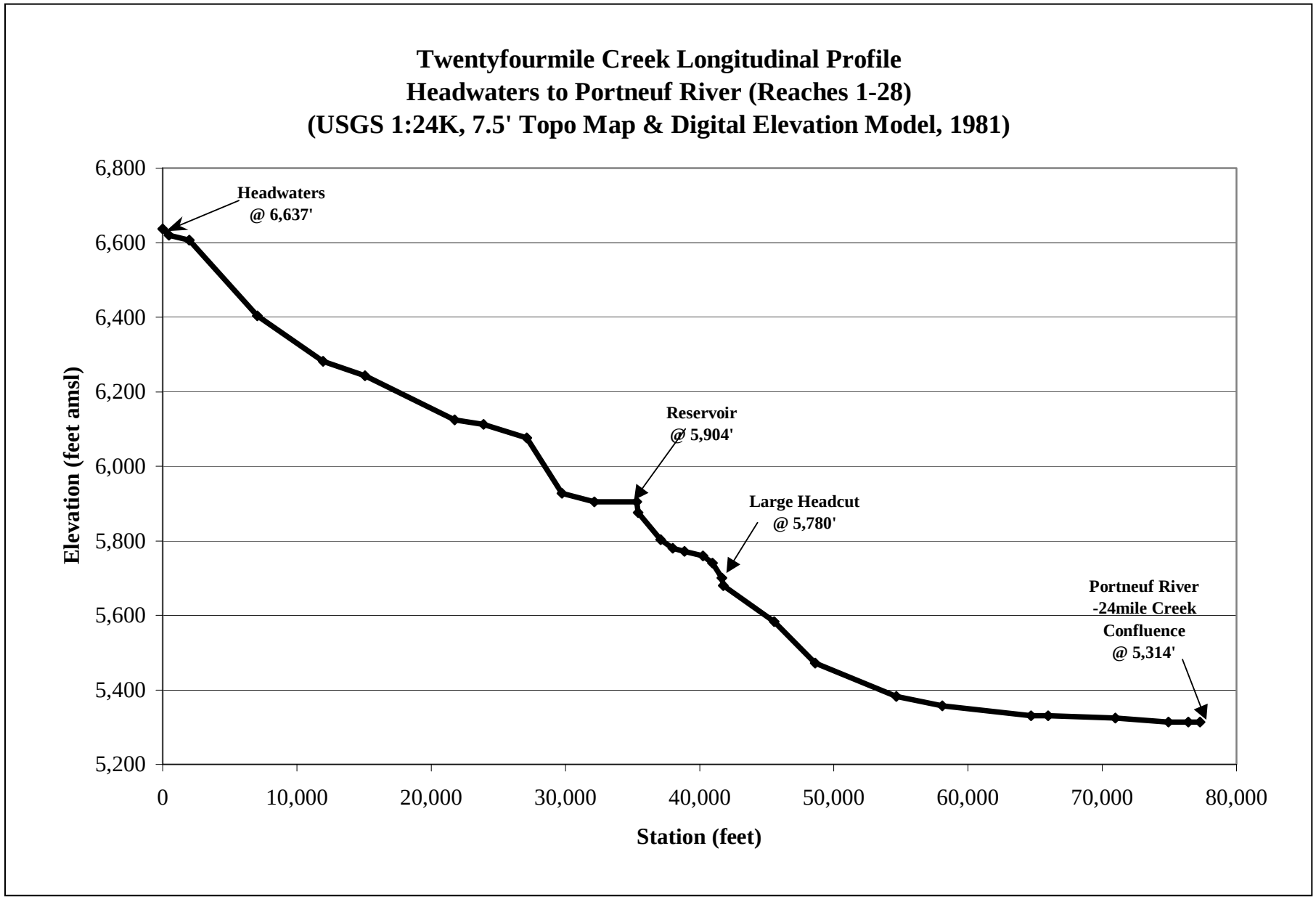
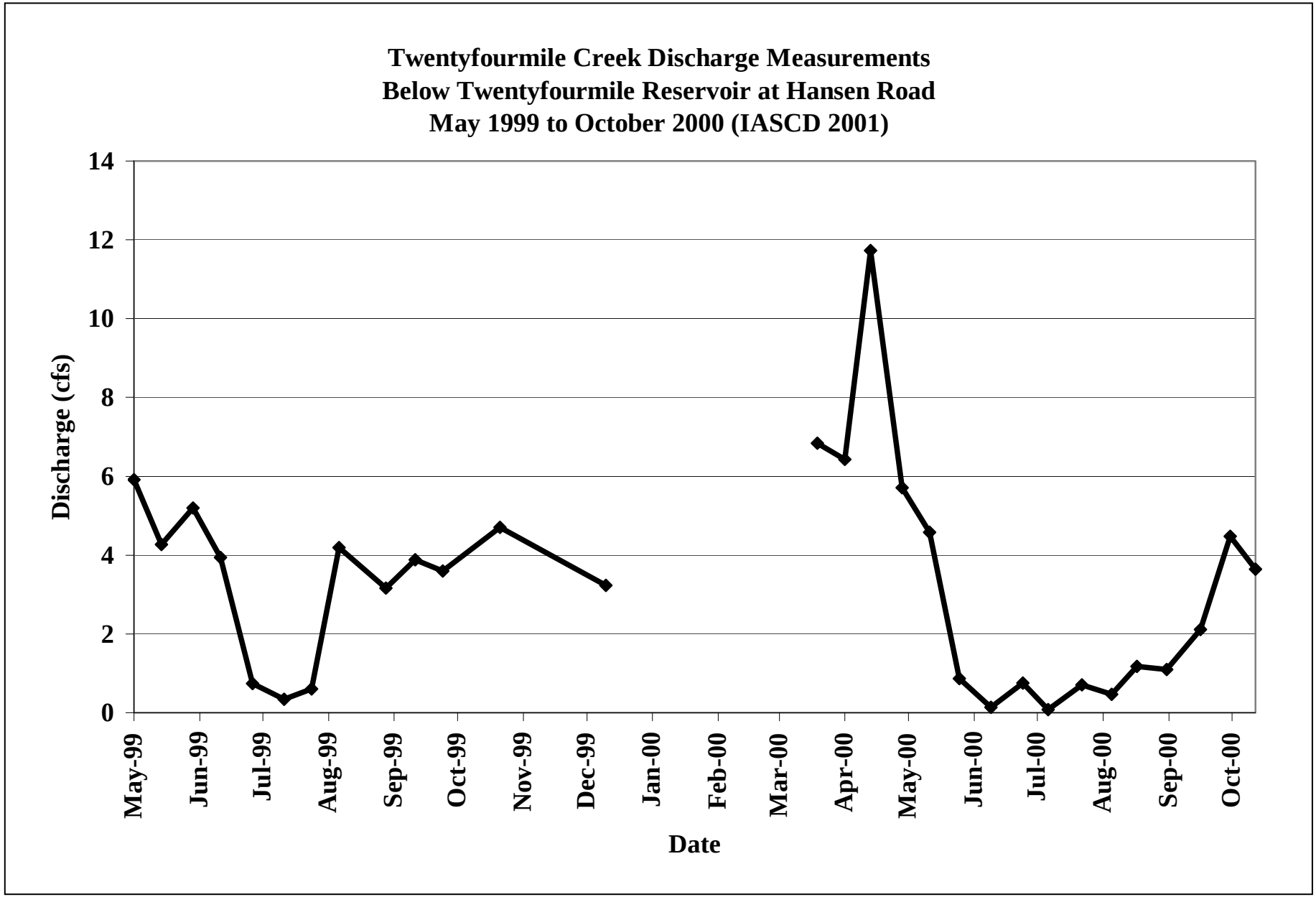


Figure 6. Twentyfourmile Creek Discharge @ IASCD Water Quality Monitoring Site



Assessment Methods

Elevations, slopes, stream order and sinuosity were determined from 1:24,000 scale USGS 7.5-minute topography maps and Digital Elevation Models (DEMs). The streams in the watershed were compiled from 1:24,000 scale Digital Line Graphs (DLGs) and Digital Orthophoto Quarter Quadrangles (DOQQs). The stream was divided into reaches using soils, geology, slope, sinuosity, vegetation, hydrology, road crossings, drainage area, valley type, and land uses. Reach descriptions are listed below in Table 4. Figures 7, 8, and 9 are plan views of Twentyfourmile Reaches 1 through 28 and Figure 10 shows East Fork Reaches 3 through 5.

There are 31 reaches that were delineated within the watershed. However only 20 reaches were assessed using three field methods. The assessment teams used the USDA-NRCS Stream Visual Assessment Protocol (SVAP), the USDI-BLM Assessing Proper Functioning Condition (PFC), and the USDA-NRCS Streambank Erosion Condition Inventory (SECI).

The USDA-NRCS SVAP method includes 14 stream characteristics and corresponding numeric values, which are then averaged to rate the reach's condition in either a poor, fair, good or excellent category.

The USDI-BLM Assessing PFC method consists of 17 factors to qualitatively determine the stream functionality and places the reach into one of three categories (proper functioning, functional at risk, or nonfunctional). SECI employs a rating from 0 to 15 assigned to each reach.

The USDA-NRCS SECI method has 6 ranking factors that includes; bank stability, bank condition, and vegetative/cover on banks, bank/channel shape, channel bottom and deposition. A rating of 0 to 4 infers slight problems with the above factors; a rating of 5 to 8 denotes moderate problems; while the severe rating of 9-15 indicates serious erosion problems.

Caribou SCD, NRCS, ISCC and IASCD staff performed the field inventory from July 17th to July 21st, 2000 in an attempt to assess non-point source impacts to riparian and stream habitats. Photos were taken at each reach to document conditions during the assessment.

The teams did not assess reaches TFMC1 through TFMC7 because there was little or no flow in the stream channel during the field inventory, which was conducted in July 2000. The teams will attempt to assess these remaining reaches sometime in 2001.

Table 4. Twentyfourmile Creek Reach Descriptions

Reach Name	Elevation (ft) at Head of Reach	Reach Length (ft)	Stream Order	Reach Slope (%)	Reach Sinuosity	Reach Drainage Area ($miles^2$)
TFMC1	6,637	465.2		3.7%	1.0	0.2
TFMC2	6,620	1,524.1		0.9%	1.1	0.4
TFMC3	6,607	5,044.0		4.0%	1.0	1.0
TFMC4	6,404	4,933.3		2.5%	1.1	2.3
TFMC5	6,282	3,118.0		1.3%	1.1	2.9
TFMC6	6,243	6,668.2		1.8%	1.1	3.8
TFMC7	6,125	2,144.2		0.6%	1.1	5.1
TFMC8	6,112	3,212.0		1.1%	1.1	8.0
TFMC9	6,076	2,627.9		5.6%	1.2	10.0
TFMC10	5,928	2,411.1		1.0%	1.2	10.0
TFMC11	5,904	3,168.0		0.9%	1.0	10.0
TFMC12	5,876	1691.1		4.3%	1.0	10.0
TFMC13	5,803	878.9		2.6%	1.4	20.0
TFMC14	5,780	903.9		1.0%	1.1	20.0
TFMC15	5,771	1,368.4		0.8%	1.2	20.0
TFMC16	5,760	706.0		2.8%	1.1	20.0
TFMC17	5,740	708.9		5.6%	1.0	20.0
TFMC18	5,700	100.7		19.9%	1.0	20.0
TFMC19	5,680	3,793.5		2.6%	1.3	22.5
TFMC20	5,583	3,050.7		3.6%	1.2	22.5
TFMC21	5,472	6,048.9		1.5%	1.1	23.0
TFMC22	5,383	3,420.7		0.8%	1.2	23.0
TFMC23	5,357	6,607.9		0.4%	1.2	23.0
TFMC24	5,331	1,277.3		0.0%	1.1	23.0
TFMC25	5,331	5,005.9		0.1%	1.1	26.7
TFMC26	5,324	3,953.4		0.3%	1.2	26.7
TFMC27	5,314	1,466.9		0.0%	1.1	26.7
TFMC28	5,314	872.1		0.0%	1.0	52.8
EF3	5,904	1,609.3		0.2%	1.1	10.0
EF4	5,900	459.6		11.1%	1.0	10.0
EF5	5,849	615.2		7.5%	1.1	10.0

Figure 7. Twentyfourmile Creek Reaches 1 through 5 Map

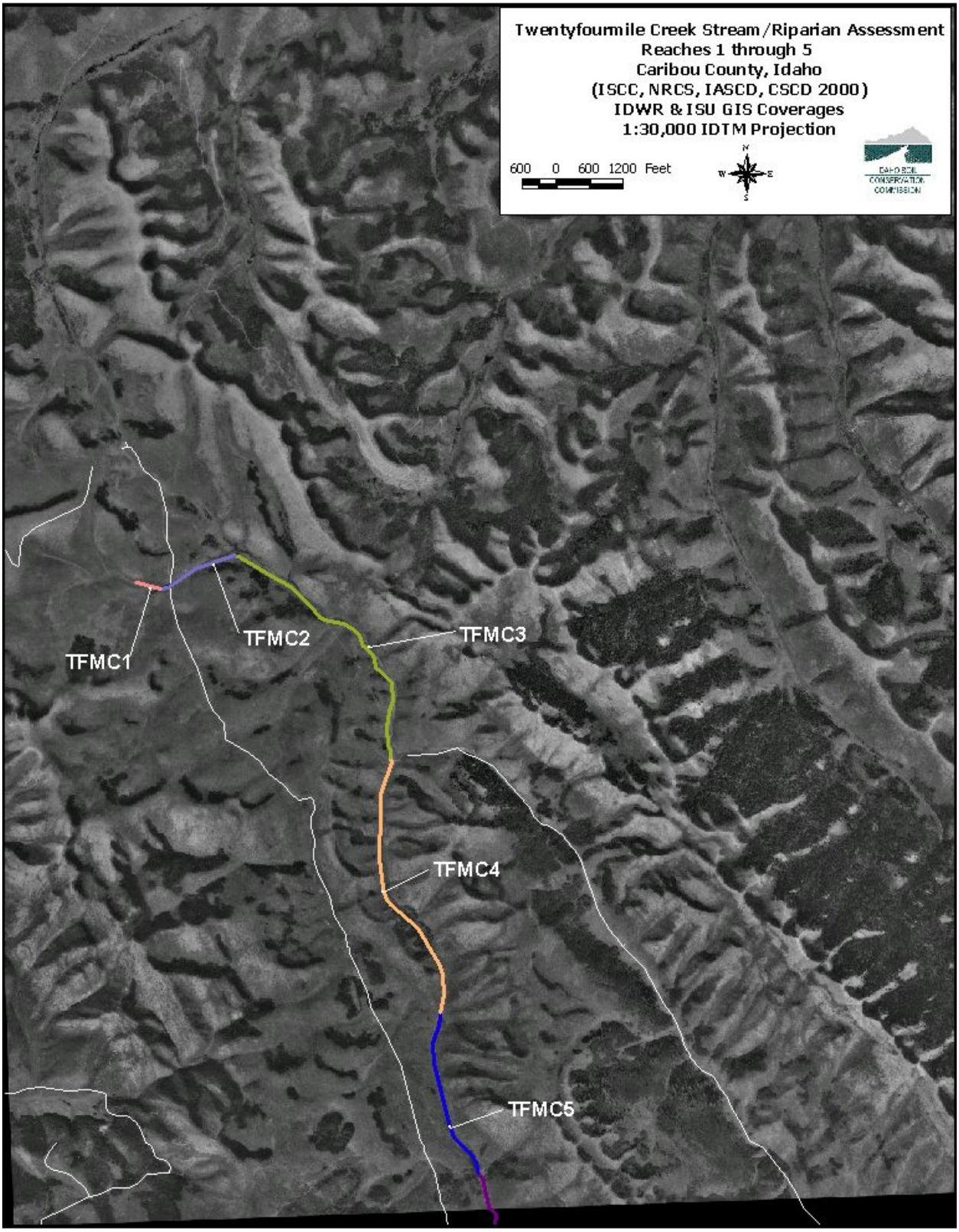


Figure 8. Twentyfourmile Creek Reaches 6 through 20 Map

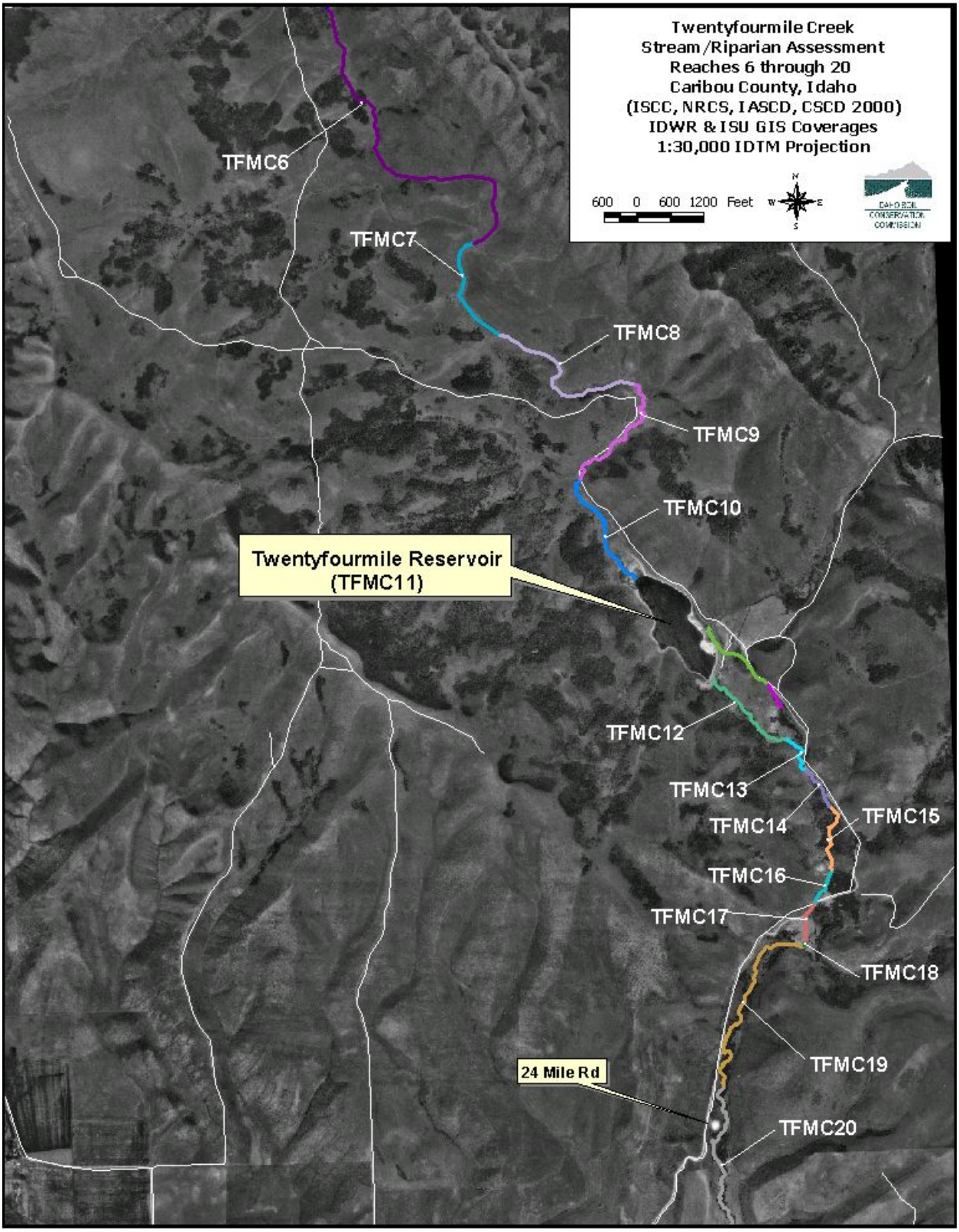


Figure 9. Twentyfourmile Creek Reaches 21 through 28 Map

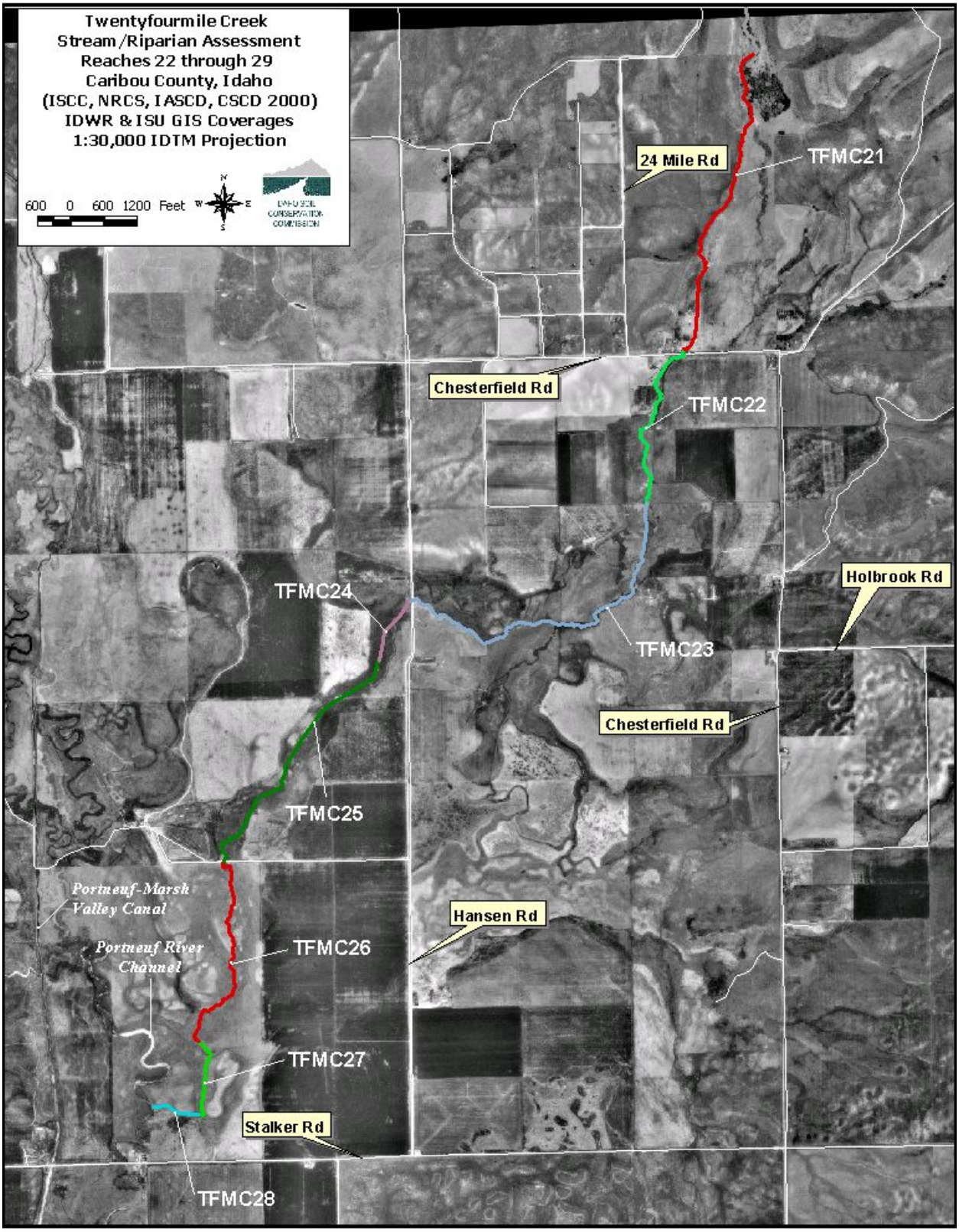
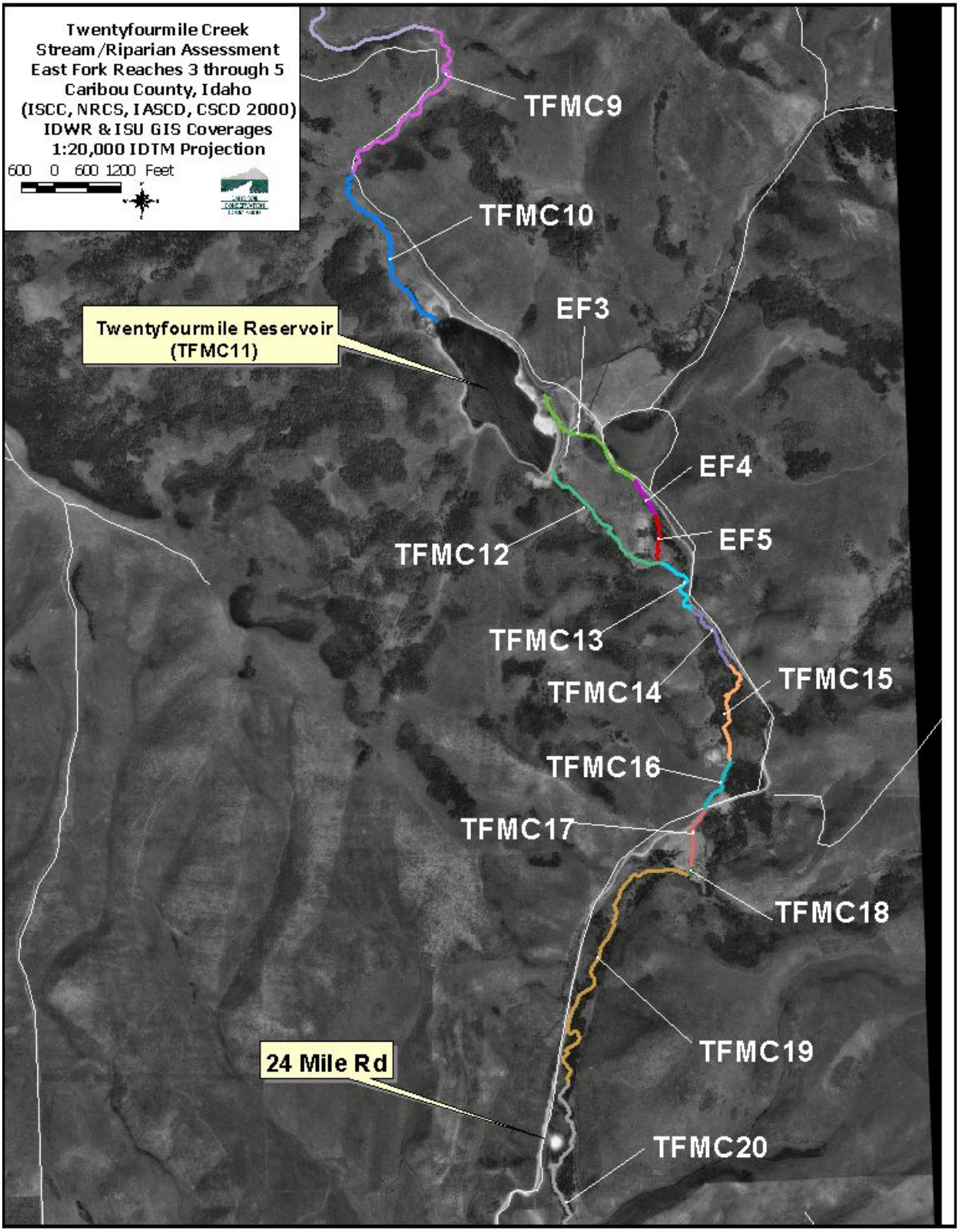


Figure 10. East Fork Reaches 1 through 5 Map



Assessment Results

Table 5. Twentyfourmile Creek Reach Assessments Summary (July 2000)

Reach Name	Length (ft)	Length (miles)	SVAP Category	PFC Rating	SECI Category	Erosion Rate (tons/yr)	Erosion Rate (tons/ft/yr)
TFMC1	465.2	0.1	The creek was dry in this reach.				
TFMC2	1,524.1	0.3	The creek was dry in this reach.				
TFMC3	5,044.0	1.0	The creek was dry in this reach.				
TFMC4	4,933.3	0.9	The creek was dry in this reach.				
TFMC5	3,118.0	0.6	The creek was dry in this reach.				
TFMC6	6,668.2	1.3	The creek was dry in this reach.				
TFMC7	2,144.2	0.4	The creek was dry in this reach.				
TFMC8	3,213.0	0.6	Poor	FAR	Moderate	65.3	0.020
TFMC9	2,706.1	0.5	Poor	FAR	Moderate	39.4	0.015
TFMC10	2,411.2	0.5	Poor	FAR	Moderate	47.8	0.020
TFMC11	3,168.0	0.6	The reach was not assessed because it contains the reservoir.				
TFMC12	1,691.1	0.3	The creek was dry or had no flow in this reach.				
TFMC13	879.2	0.2	Good	PFC	Slight	3.4	0.004
TFMC14	904.2	0.2	Fair	FAR	Moderate	9.2	0.010
TFMC15	1,368.4	0.3	The creek could not be reached because of adjacent wetlands.				
TFMC16	706.2	0.1	Poor	N	Moderate	51.5	0.073
TFMC17	709.1	0.1	Poor	N	Severe	115.0	0.162
TFMC18	100.7	0.02	The creek could not be reached and was not assessed.				
TFMC19	3,793.5	0.7	Poor	FAR	Severe	1,244.6	0.328
TFMC20	3,051.7	0.6	Poor	FAR	Moderate	604.9	0.198
TFMC21	6,050.8	1.1	Poor	FAR	Severe	2,453.8	0.406
TFMC22	150.0	0.0	Poor	FAR	Severe	9.8	0.066
TFMC22	3,271.7	0.6	Poor	FAR	Severe	66.5	0.020
TFMC23	500.0	0.1	Poor	FAR	Severe	49.2	0.098
TFMC23	6,109.8	1.2	Poor	FAR	Slight	46.9	0.008
TFMC24	1,277.6	0.2	Poor	N	Moderate	74.5	0.058
TFMC25	5,007.4	0.9	Poor	FAR	Slight	25.6	0.005
TFMC26	3,953.4	0.7	Poor	FAR	Moderate	26.0	0.007
TFMC27	1,466.9	0.3	Fair	FAR	Moderate	9.7	0.007
TFMC28	872.1	0.2	Poor	N	Moderate	17.2	0.020
EF3	1,609.3	0.3	Poor	FAR	Severe	52.8	0.033
EF4	459.6	0.1	Poor	FAR	Slight	0.3	0.001
EF5	615.2	0.1	Good	FAR	Slight	0.6	0.001
Total Assessed = 9.4 miles						Total=5,014.2	Mean=0.071

Figure 10. Twentyfourmile Creek SVAP and SECI Combined Index Chart

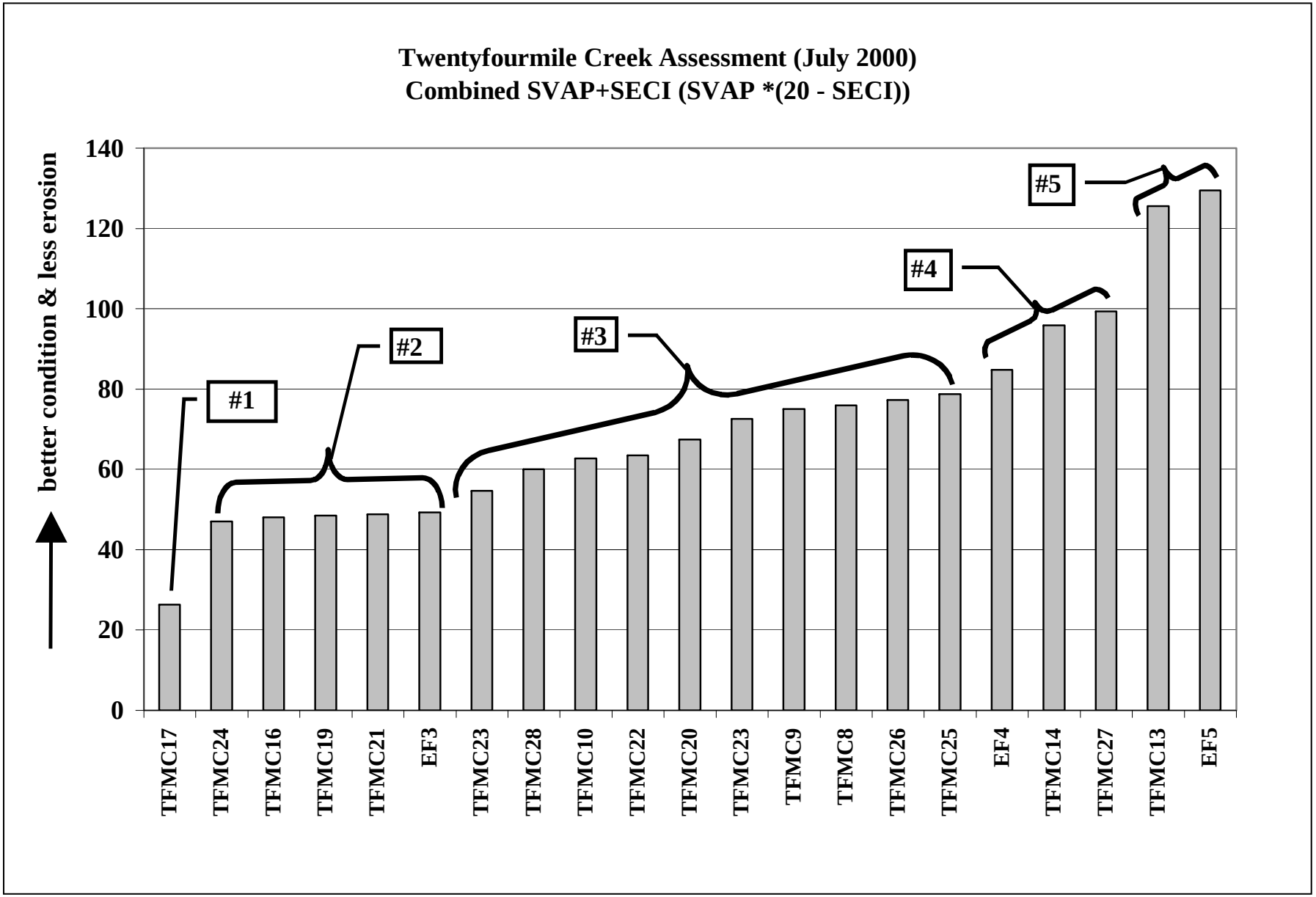


Table 6. Twentyfourmile Creek Stream Visual Assessment Protocol (SVAP) Summary (July 2000)

Reach Name	Length (ft)	Channel Condition	Hydrologic Alteration	Riparian Zone	Bank Stability	Water Appearance	Nutrient Enrichment	Fish Barriers	Instream Fish Cover	Pools	Invertebrate Habitat	Canopy Cover	Manure Presence	Macro-invertebrates	SVAP Rating	Overall Score
TFMC8	3,213	2.5	5	9	3	9	8	1	8	3	10	1	5	6	**Poor**	5.4
TFMC9	2,628	8	7	8	5	8	8	1	5	1	7	8	5	4	**Poor**	5.8
TFMC10	2,411	8	7	8	4	7	7	1	5	1	7	4	5	4	**Poor**	5.2
TFMC13	879	10	9	9	9	10	7	10	8	7	7	1	5	10	**Good**	7.8
TFMC14	904	8	10	8	7	7	7	10	8	5	7	3	3	6	**Fair**	6.8
TFMC16	706	1	3	1	1	7	7	1	5	7	7	1	5	2	**Poor**	3.7
TFMC17	709	1	3	3	2	7	5	5	3	1	3	1	2	2	**Poor**	2.9
TFMC19	3,794	1	1	5	1	7	7	1	8	7	7	10	3	5	**Poor**	4.8
TFMC20	3,051	5	3	7	1	8	8	1	8	5	9	4	5	9	**Poor**	5.6
TFMC21	6,049	2	1	5	2	8	8.5	5	8	3	10	4	4	10	**Poor**	5.4
TFMC22	3,421	7	7	5	3	7	8	1	5	5	3	1	5	2	**Poor**	4.5
TFMC23	500	7	5	10	8	7	8	1	5	3	7	3	5	2	**Poor**	5.5
TFMC23	6,108	7	7	5	3	7	8	1	5	5	3	1	5	2	**Poor**	4.5
TFMC24	1,277	6	4	3	3	4	5	5	3	2	1	1	5	5	**Poor**	3.6
TFMC25	5,006	5	7	5	7	6	7	8	5	3	1	1	5	6	**Poor**	5.1
TFMC26	3,953	6	6	8	10	8	4	5	5	2	1	1	5	6	**Poor**	5.2
TFMC27	1,467	8	7	10	8	8	6.5	10	5	3	3	5		6	**Fair**	6.6
TFMC28	872	2	6	3	5	7	3	10	3	1	1	1		6	**Poor**	4.0
EF3	1,609	3	7	5	3	7	7	10	5	2	7	1	5	2	**Poor**	4.9
EF4	460	3	10	8	8	7	8	1	3	1	1	1	5	2	**Poor**	4.5
EF5	615	8	10	10	10	9	7	1	8	7	7	7	5	10	**Good**	7.6
	9.4	**Miles**		**Percent of stream in Poor Condition**					**92%**							
				Percent of stream in Fair Condition					**5%**							
				Percent of stream in Good Condition					**3%**							
				Percent of stream in Excellent Condition					**0%**							

Table 7. Twentyfourmile Creek Proper Functioning Condition (PFC) Summary (July 2000)

Reach Name	Length (ft)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	**Rating Category**
TFMC8	3,213	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	**FAR**
TFMC9	2,628	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	Yes	No	No	**FAR**
TFMC10	2,411	Yes	No	No	No	No	No	No	No	No	No	No	Yes	Yes	N/A	Yes	No	No	**FAR**
TFMC13	879	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	**PFC**
TFMC14	904	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	**FAR**
TFMC16	706	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	N/A	No	No	No	**N**
TFMC17	709	Yes	No	No	Yes	Yes	No	No	No	No	No	No	No	No	N/A	No	No	No	**N**
TFMC19	3,794	No	N/A	No	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	No	Yes	No	No	No	**FAR**
TFMC20	3,051	Yes	N/A	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	**FAR**
TFMC21	6,049	No	N/A	No	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	No	No	No	**FAR**
TFMC22	3,421	Yes	No	No	No	Yes	No	Yes	Yes	No	Yes	No	No	No	Yes	No	No	No	**FAR**
TFMC23	6,608	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	**FAR**
TFMC24	1,277	No	N/A	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	**N**
TFMC25	5,006	Yes	N/A	No	Yes	No	No	No	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes	**FAR**
TFMC26	3,953	Yes	N/A	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	**FAR**
TFMC27	1,467	Yes	N/A	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	No	Yes	No	**FAR**
TFMC28	872	No	N/A	No	No	No	No	Yes	Yes	No	Yes	No	No	No	N/A	No	Yes	Yes	**N**
EF3	1,609	Yes	N/A	No	Yes	Yes	No	No	No	No	No	No	No	No	N/A	No	Yes	Yes	**FAR**
EF4	460	Yes	N/A	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	N/A	No	Yes	Yes	**FAR**
EF5	615	Yes	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	Yes	No	Yes	**FAR**

	9.4 Miles	**Percent of stream rated Proper Functioning Condition (PFC)**	**2%**
		Percent of stream rated Functional at Risk (FAR)	**91%**
		Percent of stream rated Nonfunctional (N)	**7%**

Table 8. Twentyfourmile Creek Streambank Erosion Condition Inventory (SECI) Summary (July 2000)

Reach Name	Length (ft)	Bank Height (ft)	Soils	Bank Stability	Bank Condition	Vegetation or Cover	Bank & Channel Shape	Channel Bottom	Deposition	Erosion Severity	Total Score	Lateral Recession Rate (ft/yr)	Erosion Rate (tons/yr)
TFMC8	3,213	2	silt loam	2	1	0	2	1	0	Moderate	6	**0.12**	**65**
TFMC9	2,628	1	silt loam	2	2	0	1	1	1	Moderate	7	**0.17**	**38**
TFMC10	2,411	1	silt loam	2	1	1	2	2	0	Moderate	8	**0.23**	**48**
TFMC13	879	1	silt loam	0	0	0	3	1	0	Slight	4	**0.05**	**3**
TFMC14	904	1	silt loam	2	1	0	2	1	0	Moderate	6	**0.12**	**9**
TFMC16	706	5	silt loam	2	1	1	1	1	1	Moderate	7	**0.17**	**51**
TFMC17	709	4	silt loam	3	3	2	1	1	1	Severe	11	**0.48**	**115**
TFMC19	3,794	10	silt loam	3	3	1	1	1	1	Severe	10	**0.39**	**1,245**
TFMC20	3,051	10	silt loam	2.5	1.5	1	2	1	0	Moderate	8	**0.23**	**605**
TFMC21	6,049	10	silt loam	3	3	2	2	1	0	Severe	11	**0.48**	**2,453**
TFMC22	150	2	silt loam	3	2	2	2	1	0	Severe	10	**0.39**	**10**
TFMC22	3,271	2	silt loam	1	1	0	3	1	0	Moderate	6	**0.12**	**67**
TFMC23	500	3	silt loam	3	2	1	2	1	1	Severe	10	**0.39**	**49**
TFMC23	6,110	2	silt loam	0	0	0	3	1	0	Slight	4	**0.05**	**47**
TFMC24	1,277	4	silt loam	2	1.5	0.5	2	1	0	Moderate	7	**0.17**	**74**
TFMC25	5,006	1	silt loam	1	0.5	0	2	1	0	Slight	4.5	**0.06**	**26**
TFMC26	3,953	1	silt loam	1	0	0	2	2	0	Moderate	5	**0.08**	**26**
TFMC27	1,467	1	silt loam	0	0.5	0	2.5	2	0	Moderate	5	**0.08**	**10**
TFMC28	872	3	silt loam	0	0	0	2	2	1	Slight	5	**0.08**	**17**
EF3	1,609	1	silt loam	3	1	2	2	1	1	Severe	10	**0.39**	**53**
EF4	460	1	silt loam	0	0	0	0	0	1	Slight	1	**0.01**	**0**
EF5	615	0.5	silt loam	0	0	0	2	1	0	Slight	3	**0.02**	**1**
	9.4		**Percent of stream with a Slight Erosion Problem**					**26%**					**5,012**
			Percent of stream with a Moderate Erosion Problem					**48%**					
			Percent of stream with a Severe Erosion Problem					**26%**					

Twentyfourmile Creek (TFMC8)

The reach starts in the SW1/4 of Section 4, Township 6 South, Range 39 East and extends downstream for 3,212 feet to the start of TFMC9. Current landuse is grazing.

Reach	TFMC8
Length (ft)	3,213
Elevation (ft)	6,112
Stream Order	2nd
Slope (%)	1.1
Sinuosity	1.1
Drainage Area (miles^2)	8
SVAP	Poor
PFC	FAR
SECI	Moderate
Erosion (t/yr)	65

This photo of TFMC8 was taken looking upstream. There was a series of old breached beaver dams that the stream has downcut through.

Ten to twelve breached inactive beaver dams with headcuts comprised the reach. The channel was incised. Riparian vegetation extended at least one active channel width. Streambanks were moderately unstable. Sedge and rushes were present however woody species were non-existent. Less than 20% of the stream was shaded. Evidence of livestock access to the riparian area was noted. The reach had infrequent flooding events above bankfull, vertical instability, insufficient vegetative cover to protect streambanks, inadequate sources of coarse/large woody material and insufficient soil moisture characteristics. The reach was found to have erosion and cracking present on streambanks. Predominantly perennial/rock covered streambanks with moderate vegetative overhang. U-shaped channel with vertical banks about 2 feet high. Channel bottom in gravels and cobbles with numerous headcuts and evidence of recent deposition.

Identified Problems

1. Sediment from livestock watering or crossings, streambank erosion and stream channel erosion
2. Temperature from lack of canopy cover and from downcutting and meadow dewatering
3. Nutrients from grazing animals

Recommended Alternatives

1) Prescribed Grazing (528A)
   - With Spring Development (574), Brush Management (314), Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)

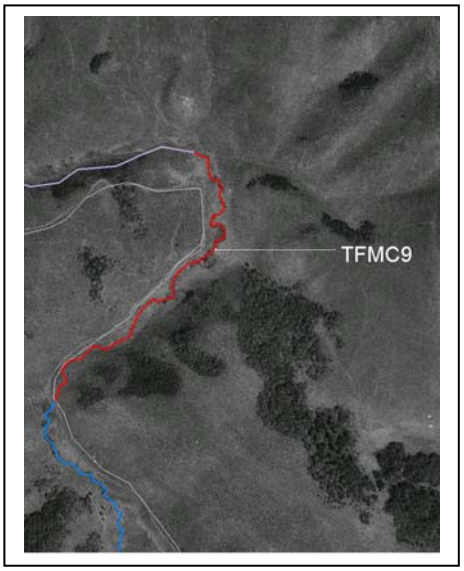
2) Riparian Forest Buffer (391A)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)

Twentyfourmile Creek (TFMC9) [No photos for this reach]

The reach starts in the NE1/4 of Section 9, Township 6 South, Range 39 East and extends downstream for 2,706 feet to the start of TFMC10 at the confluence of Twentyfourmile Creek and a small spring creek. Current landuse is cattle grazing.

Six to eight breached inactive beaver dams with headcuts comprised the reach. Riparian vegetation extended at least one active channel width. Streambanks were slightly unstable. Sedges and rushes with few woody species present. Greater than 50% of the water surface was shaded. Evidence of livestock access to the riparian area was noted.

Reach	TFMC9
Length (ft)	2,706
Elevation (ft)	6,076
Stream Order	2nd
Slope (%)	5.6
Sinuosity	1.2
Drainage Area (miles^2)	10
SVAP	Poor
PFC	FAR
SECI	Moderate
Erosion (t/yr)	39



The reach had infrequent flooding events above bankfull and the stream channel was vertically unstable. The reach was found to have erosion and cracking present on streambanks. Predominantly perennial/rock covered streambanks with severe vegetative overhang. V-shaped channel with vertical banks about 1 foot high. Channel bottom in gravels and cobbles with headcuts and evidence of recent deposition.

Identified Problems

1. Sediment from livestock watering or crossings, streambank erosion and stream channel erosion
2. Temperature from lack of canopy cover and from downcutting and meadow dewatering
3. Nutrients from grazing animals

Recommended Alternatives

1) Prescribed Grazing (528A)
   - With Spring Development (574), Brush Management (314), Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)

2) Riparian Forest Buffer (391A)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)

Twentyfourmile Creek (TFMC10)

The reach starts in the center of Section 9, Township 6 South, Range 39 East and extends downstream for 2,411 feet where it enters the upper end of Twentyfourmile Reservoir (TFMC11). Current landuse is cattle grazing.

Reach	TFMC10
Length (ft)	2,411
Elevation (ft)	5,928
Stream Order	3rd
Slope (%)	1.0
Sinuosity	1.2
Drainage Area (miles^2)	10
SVAP	Poor
PFC	FAR
SECI	Moderate
Erosion (t/yr)	48

This photo of TFMC10 was taken in April 2000 and is looking downstream towards Twentyfourmile Reservoir.

Six to eight breached inactive beaver dams with headcuts comprised the reach. Riparian vegetation extended at least one channel width. Streambanks were slightly to moderately unstable. Sedges and rushes with few woody species present. Twenty to fifty percent of the water surface was shaded. Livestock access to the riparian area was noted. The reach had low sinuosity with high width/depth ratio, inadequate sources of coarse woody debris and was vertically unstable. The reach was found to have erosion and cracking on streambanks. Annuals/perennials covered streambanks with moderate vegetative overhang. U-shaped channel with vertical banks about 1 foot high. Channel bottom in silts and gravels with active downcutting and evidence of recent deposition.

Identified Problems

1. Sediment from streambank erosion and stream channel erosion
2. Temperature from lack of canopy cover
3. Nutrients from grazing animals

Recommended Alternatives

1) Prescribed Grazing (528A)
   - With Spring Development (574), Brush Management (314), Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)

2) Riparian Forest Buffer (391A)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)

Twentyfourmile Creek (TFMC11) [No photos for this reach]

This reach is the Twentyfourmile Reservoir. The reach starts in the SE1/4 of Section 9, Township 6 South, Range 39 East and extends 3,168 feet to the dam. The reservoir drains 6,500 acres and is located halfway between the headwaters and the confluence with the Portneuf River. The reservoir is about 1.4 miles upstream of the Pole Canyon and Twentyfourmile creeks confluence. There are no irrigation diversions above the reservoir. The reservoir is 3,168 feet or 0.6 miles long and covers 34 surface acres with 700 acre-feet of water at maximum storage elevation. The dam is regulated by the Idaho Department of Water Resources and is categorized as a moderate risk, intermediate size dam at a height of 23.4 feet. Below the reservoir, the creek leaves the dam at an elevation about 5,876 feet. Current land use is recreation and grazing.

Reach	TFMC11
Length (ft)	2,168
Elevation (ft)	5,904
Stream Order	
Slope (%)	0.9
Sinuosity	1.0
Drainage Area (miles^2)	10
SVAP	
PFC	
SECI	
Erosion (t/yr)	

Recommendations

1) Assess shoreline erosion and recreational impacts
2) Perform dam structural analysis

Twentyfourmile Creek (TFMC12) [No photos for this reach]

This reach was not assessed because there was no water or flow in the stream channel. This reach starts in the NE1/4 of Section 16, Township 6 South, Range 39 East at the outlet pipe below Twentyfourmile Dam and extends 1,691 feet to the upper end of TFMC12.

Reach	TFMC12
Length (ft)	1,691
Elevation (ft)	5,876
Stream Order	3rd
Slope (%)	4.3
Sinuosity	1.0
Drainage Area (miles^2)	10
SVAP	
PFC	
SECI	
Erosion (t/yr)	

Recommendations

1) Perform assessment of reach in 2001

Twentyfourmile Creek (TFMC13)

The reach starts in the NW1/4 of Section 15, Township 6 South, Range 39 East extends downstream for 879 feet to the upper end of TFMC14. Current landuse is grazing. This reach exhibited the best riparian conditions of all the stream reaches assessed on Twentyfourmile Creek.

Reach	TFMC13
Length (ft)	879
Elevation (ft)	5,803
Stream Order	3rd
Slope (%)	2.6
Sinuosity	1.4
Drainage Area (miles^2)	20
SVAP	Good
PFC	PFC
SECI	Slight
Erosion (t/yr)	3.4

TFMC13 photos were taken facing downstream. The left one is in the middle of the reach. The right photo was on the upper end. This reach was the best of the stream reaches assessed on the creek.

The stream channel has moderate sinuosity with low width to depth ratios. Riparian vegetation extended at least two active channel widths on each side. Streambanks were stable. Sedges, rushes and willows were present. Water appearance was very clear with pools at least 3 feet deep present. No barriers to fish movement were present. Less than 20% of the water surface was shaded. Evidence of livestock access to the riparian area was noted. The reach was inundated in relatively frequent events, moderate sinuosity and low width/depth ratio, diverse age-class and composition of riparian/wetland plants. There was adequate cover on streambanks to dissipate energy and the stream channel is vertically stable. The reach does not appear to eroding. U-shaped channel, meandering channel with undercut banks about 1.0 foot high. Channel bottom in gravels and cobbles with evidence of recent deposition.

Identified Problems

1. Temperature from lack of canopy cover
2. Nutrients from grazing animals

Recommended Alternatives

1) Prescribed Grazing (528A)
   - With Spring Development (574), Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472), Channel Vegetation (322)

2) Riparian Forest Buffer (391A)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472), Channel Vegetation (322)

Twentyfourmile Creek (TFMC14)

The reach starts in the NW1/4 of Section 15, Township 6 South, Range 39 East and extends downstream for 904 feet to the upper end of TFMC15 which is a large wetland complex at an old dam site. Current landuse is grazing. A county comes into close proximity to the creek in this reach.

Reach	TFMC14
Length (ft)	904
Elevation (ft)	5,780
Stream Order	3rd
Slope (%)	1.0
Sinuosity	1.1
Drainage Area (miles^2)	20
SVAP	Fair
PFC	FAR
SECI	Moderate
Erosion (t/yr)	9.2

The TFMC14 photo is looking upstream towards TFMC13. The photo is skewed but note the vegetation contrast at the fence.

The stream channel has low to moderate sinuosity with high width to depth ratios. Riparian vegetation extended at least one active channel width on each side. Streambanks were moderately stable. Sedges, rushes and willows were present but highly utilized. Willows were abundant on the west side of creek. Twenty to fifty percent of the water surface was shaded. Occasional manure in stream was noted. The reach had high width/depth ratio, low sinuosity, and inadequate vegetation cover on banks to protect during high flows and vegetation composition is present but highly utilized. Erosion and cracking was present on the predominantly perennial covered streambanks with moderate vegetative overhang. U-shaped channel with vertical banks about 1.0 foot high. Channel bottom in gravels and cobbles with evidence of recent deposition.

Identified Problems

1. Sediment from streambank erosion
2. Sediment from unpaved road
3. Temperature from lack of canopy cover
4. Nutrients from grazing animals

Recommended Alternatives

1) Prescribed Grazing (528A)
   - With Spring Development (574), Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Channel Vegetation (322), Critical Area Planting (342)

2) Riparian Forest Buffer (391A)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Channel Vegetation (322), Critical Area Planting (342)

Twentyfourmile Creek (TFMC15)

The reach starts in the SW1/4 of Section 15, Township 6 South, Range 39 East and extends downstream for 1,368 feet to the upper end of TFMC16 at the breach in the old dam structure. Current use is grazing but curtailed by the large wetland complex and beaver dams.

Reach	TFMC15
Length (ft)	1,368
Elevation (ft)	5,771
Stream Order	3rd
Slope (%)	0.8
Sinuosity	1.2
Drainage Area ($miles^2$)	20
SVAP	
PFC	
SECI	
Erosion (t/yr)	

The photo of TFMC15 was taken from the man-made dam looking upstream. The stream flowed from the upper right to the lower left.

This reach was not rated using SVAP, PFC or SECI. However the picture below shows the end of this reach where a beaver dam was located near an old breached man-made earthen dam structure. The beaver dam was active but was not stable.

The photo of TFMC15 was taken just below the man-made dam looking upstream. A beaver dam was constructed in the breached earthen dam

Identified Problems

1. Temperature from lack of canopy cover
2. Nutrients from grazing animals

Recommended Alternatives

1) Wetland Habitat Management (644) with Fencing (382), Use Exclusion (472)

Twentyfourmile Creek (TFMC16)

The reach starts in the SW1/4 of Section 15, Township 6 South, Range 39 East and extends downstream for 706 feet to the upper end of TFMC17 at the road culvert on Twentyfourmile Road. Current landuse is grazing. This reach was

Reach	TFMC16
Length (ft)	706
Elevation (ft)	5,760
Stream Order	3rd
Slope (%)	2.8
Sinuosity	1.1
Drainage Area (miles^2)	20
SVAP	Poor
PFC	N
SECI	Moderate
Erosion (t/yr)	51

The stream channel is channelized and incised in this reach. Riparian vegetation extended at most one-third of the active channel width on each side. Streambanks were unstable. Some sedges and rushes were present but minimal. Few willows were present. Less than 20% of the water surface was shaded. Evidence of livestock access to the riparian area was noted. The reach was not inundated in relatively frequent events and beaver dams were unstable. Riparian vegetation lacked diverse age classes and composition. Streambank vegetation was inadequate to withstand high flow events. There were inadequate sources of woody debris and the stream channel is vertically unstable. Erosion and cracking were present on predominantly bare or annual covered streambanks with moderate vegetative overhang. Steep V-shaped channel with near vertical banks about 5 feet high. Channel bottom in gravels and cobbles with downcutting and no evidence of recent deposition.

The photo of TFMC16 was taken facing downstream. The road & culvert at the top of the photo is Twentyfourmile Road.

Identified Problems

1. Sediment from streambank erosion
2. Sediment from stream channel erosion
3. Temperature from lack of canopy cover and from downcutting and meadow dewatering
4. Nutrients from grazing animals

Recommended Alternatives

1) Prescribed Grazing (528A)
   - With Spring Development (574), Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Channel Vegetation (322), Critical Area Planting (342)

2) Riparian Forest Buffer (391A)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Channel Vegetation (322), Critical Area Planting (342)

Twentyfourmile Creek (TFMC17)

The reach starts in the SW1/4 of Section 15, Township 6 South, Range 39 East from the culvert on Twentyfourmile Road and extends downstream for 709 feet to the upper end of TFMC18 which is a cascade over a steep slope (>20% slope). Current landuse is grazing. There is a small diversion at the start of this reach. This reach exhibited the worst conditions of all the stream reaches. A previous stream channel and floodplain exist about 1,000 feet east of this channel. A detailed investigation is needed before any instream structural alternatives are implemented on this reach.

Reach	TFMC17
Length (ft)	709
Elevation (ft)	5,740
Stream Order	3rd
Slope (%)	5.6
Sinuosity	1.0
Drainage Area (miles^2)	20
SVAP	Poor
PFC	N
SECI	Severe
Erosion (t/yr)	115

The TFMC17 photo on the left was taken in May 2000 of the reach looking downstream and the photo and the right was taken in July 2000 looking upstream to the culvert on Twentyfourmile Road.

The stream channel is channelized and incised in this reach. Riparian vegetation extended at most one-third of the active channel width on each side. Streambanks were unstable. Some sedges, rushes and willows were present but minimal. Less than 20% of the water surface was shaded. Occasional to extensive amount of manure in the riparian area was noted. The reach was not inundated in relatively frequent events and beaver dams were unstable. Riparian vegetation lacked diverse age classes and composition. Streambank vegetation was inadequate to withstand high flow events. There were inadequate sources of woody debris and the stream channel is vertically unstable. Slumps and clumps were sloughing off into stream. Bare, rills and gullies on streambanks with severe vegetative overhang. Steep V-shaped channel with near vertical banks about 4 feet high. Channel bottom in gravels and cobbles with downcutting and no evidence of recent deposition.

Identified Problems

1. Sediment from streambank and channel erosion, unpaved road, recreational use, cattle watering areas
2. Temperature from lack of canopy cover and from downcutting and meadow dewatering
3. Nutrients from grazing animals

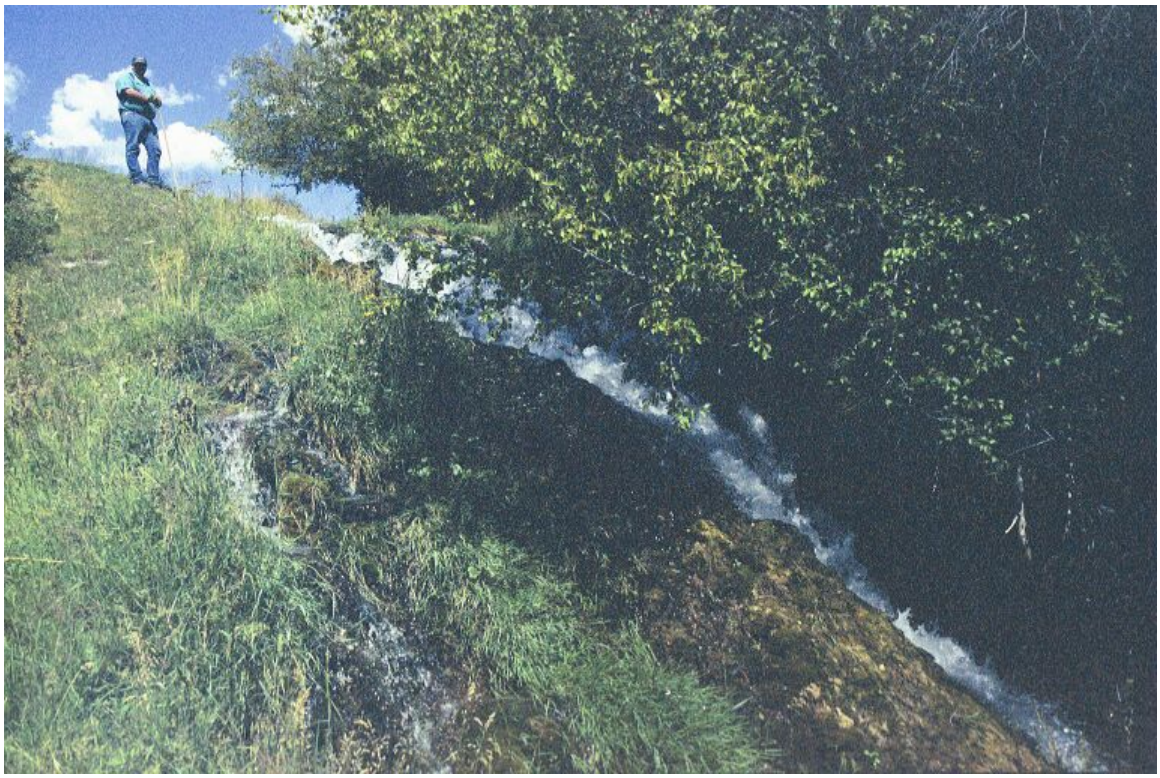
Recommended Alternatives

1) Riparian Forest Buffer (391A) on Existing Channel
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - Structure for Water Control (587) with Pipeline (516) and Trough/Tank (614)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)

2) Open Channel (582) on Previous Channel
   - With Riparian Forest Buffer (391A), Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Channel Vegetation (322), Critical Area Planting (342)

Twentyfourmile Creek (TFMC18)

The reach starts in the NW1/4 of Section 22, Township 6 South, Range 39 East and extends downstream for 100 feet to the upper end of TFMC19 at the confluence with Pole Canyon Creek. TFMC18 is a cascade over a steep slope (~20% slope) and then drops 15 to 20 feet to the stream channel. A previous stream channel and floodplain exist about 1,000 feet east of this channel. A detailed investigation is needed before any instream structural alternatives are implemented on this reach.



This photo was taken looking upstream on Reach TFMC18. Just below this cascade was a large (15 to 20 feet) head cut.

Reach	TFMC18
Length (ft)	100
Elevation (ft)	5,700
Stream Order	3rd
Slope (%)	20
Sinuosity	1.0
Drainage Area (miles^2)	20
SVAP	
PFC	
SECI	
Erosion (t/yr)	

Identified Problems

1. Sediment from stream channel erosion

Recommended Alternatives

Both structural and managerial alternatives depend on decisions made on the upstream reach TFMC17. Engineering and geologic expertise from the NRCS State Office should be pursued.

Twentyfourmile Creek (TFMC19)

The reach starts in the NW 1/4 of Section 22, Township 6 South, Range 39 East and extends 3,793 feet from the end of TFMC18 (below the cascading falls) at the confluence with Pole Canyon Creek to the upper end of TFMC20. This is the first reach that is located in the large downcut channel. Current landuse is grazing.

Reach	TFMC19
Length (ft)	3,793
Elevation (ft)	5,680
Stream Order	3rd
Slope (%)	2.6
Sinuosity	1.3
Drainage Area ($miles^2$)	22.5
SVAP	Poor
PFC	FAR
SECI	Severe
Erosion (t/yr)	1,245

The stream channel is deeply incised in this reach. Riparian vegetation extends at least one-half of the active channel width on each side. Streambanks were unstable. Some sedges and Rushes were present however woody species (including willows, alders, dogwood and birch) were abundant. Greater than 75% of the water surface was shaded. Occasional manure in the riparian area was noted. The reach was not inundated in relatively frequent events. Streambank vegetation and coverage was not capable of withstanding high flow events. The stream channel is vertically unstable. Slumps and clumps were sloughing off into stream. Bare, rills and gullies with annuals and perennials on streambanks with severe vegetative overhang. Steep V-shaped channel with near vertical banks about 15 feet high. Channel bottom in gravels and cobbles with downcutting and no evidence of recent deposition.

The TFMC19 photo was taken looking downstream.

Identified Problems

1. Sediment from streambank erosion and stream channel erosion
2. Temperature from downcutting and meadow dewatering
3. Nutrients from grazing animals

Recommended Alternatives

1) Riparian Forest Buffer (391A)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)

2) Prescribed Grazing (528A)
   - With Spring Development (574), Brush Management (314), Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)

Twentyfourmile Creek (TFMC20)

The reach starts in the NE1/4 of Section 21, Township 6 South, Range 39 East and extends 3,050 feet downstream to the upper end of TFMC21. This is the second reach that is located in the downcut channel. Current landuse is cattle grazing.

Reach	TFMC20
Length (ft)	3,050
Elevation (ft)	5,583
Stream Order	3rd
Slope (%)	3.6
Sinuosity	1.2
Drainage Area ($miles^2$)	22.5
SVAP	Poor
PFC	FAR
SECI	Moderate
Erosion (t/yr)	605

The stream channel is deeply incised in this reach. Riparian vegetation extends at least one active channel width on each side. Streambanks were unstable. Twenty to fifty percent of the water surface was shaded. Evidence of livestock access to the riparian area was noted. Slumps and clumps sloughing off into stream. Bare, rills and gullies with annuals and perennials on banks with severe vegetative overhang. U-shaped channel with vertical banks about 15 feet high. Channel bottom in gravels and cobbles with active downcutting and evidence of recent deposition.

The TFMC20 photo was taken facing upstream in July 2000.

Identified Problems

1. Sediment from streambank erosion
2. Sediment from stream channel erosion
3. Temperature from downcutting and meadow dewatering
4. Nutrients from grazing animals

Recommended Alternatives

1) Riparian Forest Buffer (391A)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)

2) Prescribed Grazing (528A)
   - With Spring Development (574), Brush Management (314), Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)

Twentyfourmile Creek (TFMC21)

The reach starts in the NE1/4 of Section 28, Township 6 South, Range 39 East and extends 6,049 feet downstream to Chesterfield Road. Current landuse is grazing with an animal feed operation and irrigation diversion at the lower end of the reach.

Reach	TFMC21
Length (ft)	6,049
Elevation (ft)	5,472
Stream Order	3rd
Slope (%)	1.5
Sinuosity	1.1
Drainage Area (miles^2)	23
SVAP	Poor
PFC	FAR
SECI	Severe
Erosion (t/yr)	2,454

The stream channel is deeply incised in this reach. Riparian vegetation extends at least one-half active channel width on each side. Streambanks were unstable. Twenty to fifty percent of the water surface was shaded. Evidence of livestock access to the riparian area was noted. The reach was not inundated in relatively frequent events and the streambank vegetation was not capable of withstanding high flow events. The stream is vertically unstable. Slumps and clumps were sloughing off into stream. Bare, rills and gullies with annuals or about 70% bare streambanks with severe vegetative overhang. U-shaped channel with vertical banks about 10 feet high. Channel bottom in gravels and cobbles and evidence of recent deposition.

This photo of TFMC21 was taken facing downstream. This is representative of the downcutting that occurred in reaches TFMC19, TFMC20 & TFMC21 in the spring of 1985.

TFMC21 photo is looking downstream on the lower reach.

Identified Problems

1. Sediment from streambank and channel erosion
2. Temperature from downcutting and meadow dewatering
3. Nutrients from grazing animals and animal feed operation

Recommended Alternatives

1) Riparian Forest Buffer (391A)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)
   - With Structure for Water Control (587), Irrigation Water Conveyance (430)
   - Waste Management System (312), Waste Storage Facility (313)
2) Prescribed Grazing (528A)
   - With Spring Development (574), Brush Management (314), Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)
   - With Structure for Water Control (587), Irrigation Water Conveyance (430)
   - Waste Management System (312), Waste Storage Facility (313)

Twentyfourmile Creek (TFMC22)

The reach starts in the NE1/4 of Section 33, Township 6 South, Range 39 East extends from the end of TFMC21 approximately 3,420 feet downstream to the irrigation diversion on the 1/2 section line. Current landuse is grazing with a confined animal feed operation and irrigation diversion along the reach.

Reach	TFMC22
Length (ft)	3,421
Elevation (ft)	5,383
Stream Order	3rd
Slope (%)	0.8
Sinuosity	1.2
Drainage Area (miles^2)	23
SVAP	Poor
PFC	FAR
SECI	Severe
Erosion (t/yr)	76

TFMC22 photo was taken looking downstream on the upper end of the reach. In the middle of the picture the stream splits into two channels. The left channel flows into an irrigation pump system.

Riparian vegetation extends at least one-half active channel width on each side. Streambanks were moderately unstable. Less than 20% of the water surface was shaded. Livestock access to the riparian area was noted. The riparian vegetation reach had no diverse age-classes and incapable of withstanding high flow events with inadequate source of woody debris. Stream channel is vertically unstable. Erosion is evident with perennials covered streambanks with moderate vegetative overhang. U-shaped channel, meandering channel with undercut banks about 2 foot high. Channel bottom in gravels with evidence of active downcutting and recent deposition.

This photo of TFMC22 was taken facing upstream from the lower end of the reach.

Identified Problems

1. Sediment from streambank and channel erosion
2. Temperature from lack of canopy cover
3. Nutrients from grazing animals and confined animal feed operation

Recommended Alternatives

1) Riparian Forest Buffer (391A)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)
   - With Structure for Water Control (587), Irrigation Water Conveyance (430)
   - Waste Management System (312), Waste Storage Facility (313), Irrigation Water Management (449), Nutrient Management (590)
2) Prescribed Grazing (528A)
   - With Spring Development (574), Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)
   - With Structure for Water Control (587), Irrigation Water Conveyance (430)
   - Waste Management System (312), Waste Storage Facility (313), Irrigation Water Management (449), Nutrient Management (590)

Twentyfourmile Creek (TFMC23)

The reach starts in the center of Section 33, Township 6 South, Range 39 East at the irrigation diversion structure and extends downstream 6,607 feet to Hansen Road. Current landuse is grazing. Twentyfourmile Creek below this diversion is de-watered most of the irrigation season. The water is diverted into two lateral ditches for irrigation.

Reach	TFMC23
Length (ft)	6,608
Elevation (ft)	5,357
Stream Order	3rd
Slope (%)	0.4
Sinuosity	1.2
Drainage Area (miles^2)	23
SVAP	Poor
PFC	FAR
SECI	Slight
Erosion (t/yr)	96

The TFMC23 photo was taken facing downstream just below the irrigation diversion at the start of the reach.

TMFC23 photos: Irrigation diversion stucture (top) and headcut (bottom).

Riparian vegetation extends at least two active channel width on each side. Streambanks were moderately stable. Twenty to fifty of the water surface was shaded. Evidence of livestock access to the riparian area was noted. There were unstable beaver dams. The reach had low sinuosity, few willows and is vertically unstable. Does not appear to be eroding. Predominantly perennials covering streambanks with slight vegetative overhang. U-shaped channel, meandering channel with undercut banks about 2 foot high. Channel bottom in gravels and cobbles and evidence of recent deposition.

Identified Problems

1. Sediment from streambank and channel erosion
2. Temperature from lack of canopy cover
3. Nutrients from grazing animals

Recommended Alternatives

1) Riparian Forest Buffer (391A)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322),
   - With Structure for Water Control (587), Irrigation Water Conveyance (430), Irrigation Water Management (449)
2) Prescribed Grazing (528A)
   - With Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322),
   - With Structure for Water Control (587), Irrigation Water Conveyance (430), Irrigation Water Management (449)

Twentyfourmile Creek (TFMC24)

The reach starts in the SW1/4 of Section 32, Township 6 South, Range 39 East at Hansen Road and extends downstream 1,277 feet to the fence line near the mainline irrigation pipes crossing the stream. Current landuse is irrigated pasture and grazing.

Reach	TFMC24
Length (ft)	1,277
Elevation (ft)	5,331
Stream Order	3rd
Slope (%)	0.1
Sinuosity	1.1
Drainage Area (miles^2)	23
SVAP	Poor
PFC	N
SECI	Moderate
Erosion (t/yr)	75

The creek is channelized and incised in this reach. Riparian vegetation extends at most one-third of active channel width. Streambanks were moderately unstable. Less than 20% of the water surface is shaded. Riffles are completely embedded. Evidence of livestock access to the riparian area was noted. The reach was not inundated in relatively frequent events. The floodplain and channel are inadequate to dissipate energy and point bars are not revegetating. Stream movement is not associated with natural sinuosity and stream channel is vertically unstable. Erosion and cracking present. Predominantly perennials covering streambanks with moderate vegetative overhang. U-shaped channel with vertical banks about 4 feet high. Channel bottom in gravels and cobbles with downcutting and evidence of recent deposition.

This TFMC24 reach photo was taken looking upstream from the middle of the reach.

This upstream photo of a stream crossing for a field road is located in the middle of reach TFMC24.

Identified Problems

1. Sediment from streambank and channel erosion
2. Temperature from lack of canopy cover
3. Nutrients from grazing animals

Recommended Alternatives

1) Riparian Forest Buffer (391A) or Riparian Herbaceous Buffer (390)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322)

2) Prescribed Grazing (528A)
   - With Water Well (642), Spring Development (574), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322)

Twentyfourmile Creek (TFMC25)

The reach starts in the NW1/4 of Section 4, Township 7 South, Range 39 East and extends downstream 5,006 feet to the ranch headquarters access road located on the section line between Section 5 and 8, Township 7 South, Range 39 East. Current landuse is grazing.

Reach	TFMC25
Length (ft)	5,006
Elevation (ft)	5,330
Stream Order	3rd
Slope (%)	0.1
Sinuosity	1.1
Drainage Area ($miles^2$)	26.7
SVAP	Poor
PFC	N
SECI	Moderate
Erosion (t/yr)	26

The TFMC25 photo was taken on the lower end of the reach facing upstream.

Riparian vegetation extends at most one-half of active channel width on each side. Streambanks were moderately stable. Less than 20% of the water surface was shaded. Riffle is completely embedded. Evidence of livestock access to the riparian are was noted. The reach had low sinuosity with no diverse age-classes and low vigor. There was no source of woody debris and stream movement is not associated with natural sinuosity. Erosion is evident. Predominantly perennials covering streambanks with slight vegetative overhang. U-shaped channel with vertical banks about 1 foot high. Channel bottom in gravels and cobbles and evidence of recent deposition.

Identified Problems

1. Sediment from streambank
2. Temperature from lack of canopy cover
3. Nutrients from grazing animals

Recommended Alternatives

1) Prescribed Grazing (528A)
   - With Water Well (642), Spring Development (574), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472), Channel Vegetation (322)

2) Riparian Forest Buffer (391A) or Riparian Herbaceous Buffer (390)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472), Channel Vegetation (322)

Twentyfourmile Creek (TFMC26)

The reach starts at the end of TFMC25 at the ranch access road located on the section between Section 5 and 8, Township 7 South, Range 39 East. The reach extends downstream 3,953 feet to the property boundary fence located on the half section line in Section 8, Township 7 South, Range 39 East. Current landuse is grazing.

Reach	TFMC26
Length (ft)	3,953
Elevation (ft)	5,324
Stream Order	3rd
Slope (%)	0.3
Sinuosity	1.2
Drainage Area (miles^2)	26.7
SVAP	Poor
PFC	FAR
SECI	Moderate
Erosion (t/yr)	26

This photo of TFMC26 was taken on the upper end of the reach facing downstream.

Riparian vegetation extends at least one active channel width on each side. Streambanks were stable. Less than 20% of the water surface was shaded. Evidence of livestock access to the riparian are was noted. The reach was low sinuosity and no source of woody debris. Erosion is evident. Predominantly perennials covering streambanks with slight vegetative overhang. U-shaped channel with vertical banks about 1 foot high. Channel bottom in silt, sand and gravels with active downcutting and evidence of recent deposition.

Identified Problems

1. Sediment from streambank
2. Temperature from lack of canopy cover
3. Nutrients from grazing animals

Recommended Alternatives

1) Prescribed Grazing (528A)
   - With Water Well (642), Spring Development (574), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Stream Channel Stabilization (584), Channel Vegetation (322)

2) Riparian Forest Buffer (391A) or Riparian Herbaceous Buffer (390)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Stream Channel Stabilization (584), Channel Vegetation (322)

Twentyfourmile Creek (TFMC27)

The reach starts at the end of TFMC26 at the property boundary fence located in the SW1/4 of Section 8, Township 7 South, Range 39 East and extends downstream 1,467 feet to the Twentyfourmile Creek and Eighteenmile Creek confluence. Historical landuse was hayland. The reach has been rested for nine years due to a high water table.

Reach	TFMC27
Length (ft)	1,467
Elevation (ft)	5,314
Stream Order	3rd
Slope (%)	0.01
Sinuosity	1.1
Drainage Area (miles^2)	26.7
SVAP	Fair
PFC	FAR
SECI	Moderate
Erosion (t/yr)	10

The TFMC27 photo was taken facing downstream on the upper end. Sedge and Rush were 2 to 3 feet tall within this reach.

Riparian vegetation extends more than two active channel widths on each side. Streambanks were stable. Sedges and rushes were 2 to 3 feet tall. Twenty to fifty percent of the water surface was shaded. Riffles are completely embedded. Does not appear to be eroding. Perennials covering streambanks with slight vegetative overhang. U-shaped, meandering channel with undercut banks about 1 foot high. Channel bottom in silt, sand and gravels evidence of recent deposition.

Identified Problems

1. Temperature from lack of canopy cover

Recommended Alternatives

1) Wetland Habitat Management (644)
   - With Fencing (382), Use Exclusion (472)

2) Prescribed Grazing (528A)
   - With Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)

3) Riparian Forest Buffer (391A) or Riparian Herbaceous Buffer (390)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)

Twentyfourmile Creek (TFMC28)

The reach starts in the SW 1/4 of Section 8, Township 7 South, Range 39 East at the Twentyfourmile Creek and Eighteenmile Creek confluence and extends downstream 872 feet to the Twentyfourmile Creek and Portneuf River (old channel) confluence. Current landuse is hayland.

The photo on the left is reach TFMC28 facing upstream just before the creek enters the old Portneuf River channel shown in the right photo.

Riparian vegetation extends at most one-third of the active channel width on each side. Streambanks were slightly stable. Less than 20% of the water surface was shaded. Macroinvertebrates were dominated by facultative species. Riffles are completely embedded. The reach was not inundated in relatively frequent events. Sinuosity and gradient are not in balance with landscape setting. Riparian vegetation lacked diverse age-class distribution and is inadequate to protect banks. Does not appear to be eroding. Predominantly perennials covering streambanks with slight vegetative overhang. U-shaped channel with vertical banks about 3 feet high. Channel bottom in silt and sand with evidence of recent deposition.

Reach	TFMC28
Length (ft)	872
Elevation (ft)	5,314
Stream Order	3rd
Slope (%)	0.01
Sinuosity	1.1
Drainage Area (miles^2)	53
SVAP	Poor
PFC	N
SECI	Moderate
Erosion (t/yr)	17

Identified Problems

2. Temperature from lack of canopy cover

Recommended Alternatives

1) Forage Harvest Management (511)

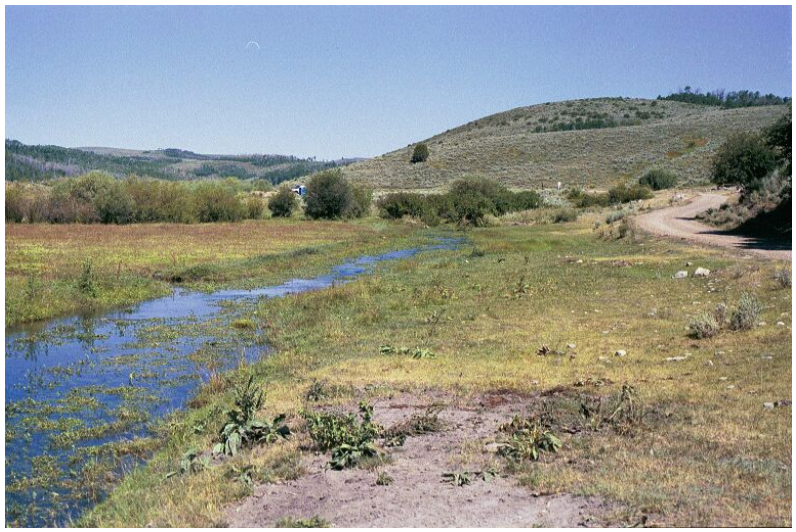
2) Prescribed Grazing (528A)
   - With Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)

3) Riparian Forest Buffer (391A) or Riparian Herbaceous Buffer (390)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)

East Fork (EF3)

The reach starts in the SE1/4 of Section 9, Township 6 South, Range 39 East and extends downstream for 615 feet to the upper end of EF4 where the stream descends down a steep slope (>20% slope). Current landuse is grazing with recreational uses. The major impact in this reach is channelization and animal access with some recreational uses.

Reach	EF3
Length (ft)	1,609
Elevation (ft)	5,904
Stream Order	1st
Slope (%)	0.2
Sinuosity	1.1
Drainage Area (miles^2)	10
SVAP	Poor
PFC	FAR
SECI	Severe
Erosion (t/yr)	53



This photo of EF3 was taken in July 2000 and is looking upstream. To the right of the creek is Twentyfourmile Road.

The stream channel is braided and then channelized. Riparian vegetation extended only one-half of the active channel width. Streambanks were moderately unstable. Sedges and rushes with few willows were present in the upper section of reach. Less than 20% of the water surface was shaded. Evidence of livestock access to the riparian area was noted. The reach had low sinuosity with high width/depth ratio, insufficient vegetative cover to protect streambanks, inadequate source of coarse/large woody material, insufficient soil moisture characteristics, low vigor riparian plants and excessive streambank trampling. The reach was found to have slumps and clumps sloughing into the stream. Streambanks were covered with annuals or about 70% bare with moderate vegetative overhang. U-shaped channel with vertical banks about 1 foot high. Channel bottom in gravels and cobbles with evidence of recent deposition.

Identified Problems

1. Sediment from streambank erosion and stream channel erosion
2. Temperature from lack of canopy cover
3. Nutrients from grazing animals

Recommended Alternatives

1) Prescribed Grazing (528A)
   - With Spring Development (574), Brush Management (314), Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)
2) Riparian Forest Buffer (391A)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Streambank Protection (580), Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)

East Fork (EF4)

The reach starts in the NW1/4 of Section 15, Township 6 South, Range 39 East and descends down a steep slope (>20% slope) for 460 feet to the bottom of the steep slope at the property boundary fence. Current landuse is grazing.

Reach	EF4
Length (ft)	460
Elevation (ft)	5,900
Stream Order	1st
Slope (%)	11.1
Sinuosity	1.0
Drainage Area (miles^2)	10
SVAP	Poor
PFC	FAR
SECI	Slight
Erosion (t/yr)	0.3

The photo of EF4 was taken in April 2000 and looking west from Twentyfourmile Road.

The stream channel is braided. Riparian vegetation extends one active channel width. Streambanks were moderately stable. Some sedges and rushes with few willows were present. Less than 20% of the water surface was shaded. Evidence of livestock access to the riparian area was noted. The reach had high width/depth ratio and inadequate source of coarse/large woody material.

The reach does not appear to be eroding. Predominantly perennials/rock covered streambanks with no vegetative overhang. V-shaped channel with banks about 1 foot high. Channel bottom in non-eroding bedrock with no evidence of recent deposition.

Identified Problems

1. Sediment from streambank erosion and stream channel erosion
2. Temperature from lack of canopy cover
3. Nutrients from grazing animals

Recommended Alternatives

1) Prescribed Grazing (528A)
   - With Spring Development (574), Brush Management (314), Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Channel Vegetation (322), Critical Area Planting (342)
2) Riparian Forest Buffer (391A)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Channel Vegetation (322), Critical Area Planting (342)

East Fork (EF5)

The reach starts in the NW1/4 of Section 15, Township 6 South, Range 39 East and extends downstream for 1,609 feet to the upper end of TFMC13. Current landuse is grazing. This reach exhibited next to the best riparian conditions of all the stream reaches assessed on East Fork and Twentyfourmile Creek.

Reach	EF4
Length (ft)	460
Elevation (ft)	5,900
Stream Order	1st
Slope (%)	11.1
Sinuosity	1.0
Drainage Area ($miles^2$)	10
SVAP	Poor
PFC	FAR
SECI	Slight
Erosion (t/yr)	0.3

EF5 reach photo was taken looking downstream in July 2000. This reach was next to the best of the stream reaches assessed.

The stream channel has moderate sinuosity with a head cut at the lower end of the reach. Riparian vegetation extended at least two active channel widths on each side. Streambanks were stable. Sedges, rushes and willows were present in abundance. Greater than 50% of the water surface was shaded. Evidence of livestock access to the riparian area was noted. Overall the stream is in good condition but a head cut on the lower end of the reach prevents a proper functioning rating. The reach does not appear to eroding. Even the head cut has abutted against a calcified bench (travertine substrate?). Predominantly perennials/rock covered streambanks with slight vegetative overhang. U-shaped channel with vertical banks about 0.5 foot high. Channel bottom in gravels and cobbles with evidence of recent deposition.

Identified Problems

1. Sediment from stream channel erosion
2. Nutrients from grazing animals

Recommended Alternatives

1) Prescribed Grazing (528A)
   - With Spring Development (574), Water Well (642), Fencing (382), Trough/Tank (614), Pipeline (516), Use Exclusion (472)
   - With Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)

2) Riparian Forest Buffer (391A)
   - With Fencing (382), Buffer Strip (307), Use Exclusion (472)
   - With Stream Channel Stabilization (584), Channel Vegetation (322), Critical Area Planting (342)